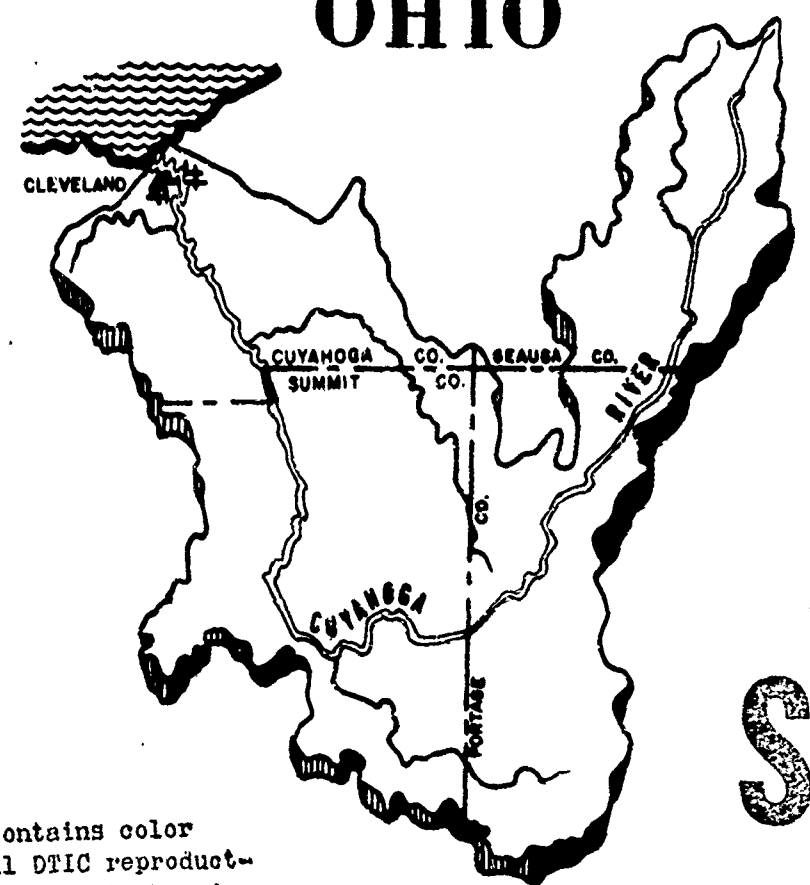
FLOOD PLAIN INFORMATION

CUYAHOGA RIVER

FRANKLIN TWP
CITY OF STREETSBORO
AND SHALERSVILLE TWP
PORTAGE COUNTY
OHIO



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PREPARED FOR
OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF PLANNING
FLOOD PLAIN MANAGEMENT SECTION
AND
TRI-COUNTY REGIONAL PLANNING COMMISSION
BY
CORPS OF ENGINEERS, U.S. ARMY
BUFFALO DISTRICT
JUNE 1974

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

THE PURPOSE OF THIS STUDY IS TO COLLECT AND DEVELOP INFORAMTION ON PAST AND PROBABLE FUTURE FLOODS WHICH MAY BE USEFUL TO LOCAL AUTHORITIES IN FURTHER STUDIES, PLANNING AND ACTION DESIGNED TO ELIMINATE OR REDUCE FLOOD HAZARDS AND TO AVOID FUTURE DAMAGES LIKELY TO BE ASSOCIATED WITH DEVEELOPMENT IN FLOOD PLAIN AREAS. THIS REPORT IS BASED ON HYDROLOGICAL FACTS, HISTROIC FLOOD DATA, AND OTHER TECHNICAL INFORMATION BEARING ON THE OCCURRENCE AND MAGNITUDE OF FLOOD DISCHARGES WITHIN THE STUDY AREA. THIS REPROT COVERS 10.7 MILES OF STREAM AND FLOOD PLAIN AREA ALONG

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SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

CUYAHOGA RIVER BEGINNING AT LAKE ROCKWEL DAM AND EXTENDING UPSTREAM TO THE NORTHERN BAOUNDARY OF SHALERSVILLE TOWNSHIP, ALL IN PORTAGE COUNTY. WITHIN THE STUDY REACH THE RIVER FLOWS IN A SOUTHWEST DIRECTION THROUGH THE NORTH-WEST QUADRANT OF SHALERSVILLE TOWNSHIP, JUST INSIDE THE EASTERN LIMIT OF THE CITY OF GREETSORA IT TURNS AND FLOWS TO THE SOUTH, DISCHARGING INTO LAKE ROCKWELL IN THE SOUTHEAST CORNER OF STREETSBOTO. THAT PORTION OF THE CUYAHOGA RIVER IN FRANKLIN TOWNSHIP IS ENTIRELY WITHIN THE POOL MAINTAINED BY LAKE ROCKELL DAM.

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INTRODUCTION

Flood plains exist primarily to temporarily convey and store flood flows which periodically exceed the capacity of the natural or man-made watercourses therein. They have also been an inviting although not always a profitable or wise attraction for development by man. Advantages of waterborne transportation and commerce led to early settlement along the river networks and the strong aesthetic attraction water holds for man has further encouraged encroachment into flood prone areas.

Where such development has occurred, floods threaten life, health, property, and disrupt business among its other impacts on man's environment. An obvious solution to this problem is to exercise greater wisdom in the use of flood plains. However, such wisdom cannot be exercised unless there is adequate knowledge of the flood hazard potential and a will on the part of the users of flood plains to plan with the hazard in mind. Regulatory powers to effect sound land use in flood prone areas have not been used extensively until recent years. Because flood plains are attractive development sites, flood plain management practices cannot of themselves eliminate flood damages but can certainly reduce them and should be given greater consideration by both planners and local governments. Consequently, the Flood Plain Management Services Program was developed within the Corps of Engineers to provide local governments with a better understanding of their flood problems and their effect on future growth and development. The program provides flood hazard information that may be used to develop land use regulations for guiding community growth.

This flood plain information report is for the Cuyahoga River, beginning at Lake Rockwell dam and extending upstream to the northern boundary of Shalersville Township, in Portage County. It has been prepared at the request of the Ohio Department of Natural Resources, Division of Planning, Flood Plain Management Section and the Tri-County Regional Planning Commission and will be distributed to local interests through these agencies.

The purpose of this study is to collect and develop information on past and probable future floods which may be useful to local authorities in further studies, planning, and action designed to eliminate or reduce flood hazards and to avoid future damages likely to be associated with development in flood plain areas. With this report information, future development in flood prone areas can be planned at elevations high enough to avoid flood damages or at least with full recognition of the chance or hazards of flooding that exist.

This report is based on hydrological facts, historic flood data, and other technical information having a bearing on the occurrence and magnitude of flood discharges within the study area.

Included in this report are maps, profiles, photographs, and cross sections which indicate the extent of flooding that might occur in the future. If properly used, this information can be beneficial in flood plain management. The maps, profiles, and cross sections indicate the depth of probable flooding at any location which would result from the occurrence of either the Intermediate Regional Flood or the Standard Project Flood.

The report does not include plans for solutions of flood problems but provides the basis for further study and planning on the part of local governments to arrive at solutions which will minimize future flood damages. This can be accomplished by local planning programs which guide essential development by controlling the type of land use in the flood plain through zoning, building codes, health regulations, and other regulatory methods. Pamphlets and guides pertaining to flood plain regulations, flood proofing, and other related actions have been prepared by the Corps of Engineers. They are available to State agencies, local governments, and citizens for planning and acting to reduce flood damage potential.

The Buffalo District of the Corps of Engineers will, upon request, provide technical assistance to Federal, State, and local agencies in the interpretation and use of the information contained within this report and will provide other available related flood data. Requests for technical assistance should be coordinated through the Ohio Department of Natural Resources, Division of Planning, Flood Plain Management Section, Fountain Square, Columbus, Ohio 43224.

SUMMARY OF FLOOD SITUATION

This report covers 10.7 miles of stream and flood plain area along Cuyahoga River beginning at Lake Rockwell dam and extending upstream to the northern boundary of Shalersville Township, all in Portage County. Within the study reach the river flows in a southwest direction through the northwest quadrant of Shalersville Township. Just inside the eastern limit of the City of Streetsboro it turns and flows to the south, discharging into Lake Rockwell in the southeast corner of Streetsboro. That portion of the Cuyahoga River in Franklin Township is entirely within the pool maintained by Lake Rockwell dam. The location of the length of the Cuyahoga River included in this study is shown on the basin map on Plate 1.

Past Flood Occurrences - There are no stream gaging stations or official records of past floods along the study reach of the Cuyahoga River. The nearest gaging station is at Hiram Rapids, approximately 7 miles upstream of the upstream limits of the study. The greatest known flood recorded on the Cuyahoga River at this gage occurred on January 23, 1959. At that time, the river was 5 feet above the bankfull stage. Other severe floods occurred in March 1948, 1960, 1962, and 1964. No high water marks or other records of these past floods within the study reach are available however.

Intermediate Regional Flood - The Intermediate Regional Flood is a flood that has an average frequency of occurrence in the order of once in 100 years. It is the minimum flood recommended by the Ohio Department of Natural Resources to define the regulatory flood plain.

Standard Project Flood - The Standard Project Flood is a flood produced by the most severe combination of meteorological and hydrological conditions that is considered reasonably characteristic of the drainage basin under study. The elevation obtained from a flood of this magnitude is considered by the Corps of Engineers to be the upper limit of the flood plain.

Flood Damages - Within the study reach relatively little development has taken place. This is of course the proper time to identify flood prone areas and establish local regulations to prevent unwise use and development from encroaching into the flood plain thereby increasing the flood damage potential. It is the purpose of this report to provide local officials with the needed flood elevations and flood area maps so that they can proceed with adopting flood plain regulations. An occurrence of the Intermediate Regional Flood or Standard Project Flood in the study reach would cause damage to any development within the flooded area because of the depth of flooding and accompanying higher velocities.

Main Flood Season - The highest discharges recorded on the Cuyahoga River at the Hiram Rapids gage normally occur between December and April. However, it is possible for flooding to occur in any month of the year. Flooding during the winter and spring months is normally the result of melting snow accompanied by moderate amounts of rainfall. Intense local thunderstorms during the summer and fall can also produce flooding.

Flood Damage Prevention Measures - The study area has had a relatively small amount of flood damage in the past. This is fortunate, and to insure that flood damage remains at a minimum, effective flood plain regulations should be enacted and enforced to protect others from unwisely developing in flood hazard areas. The Tri-County Regional Planning Commission can assist in the drafting of flood plain legislation.

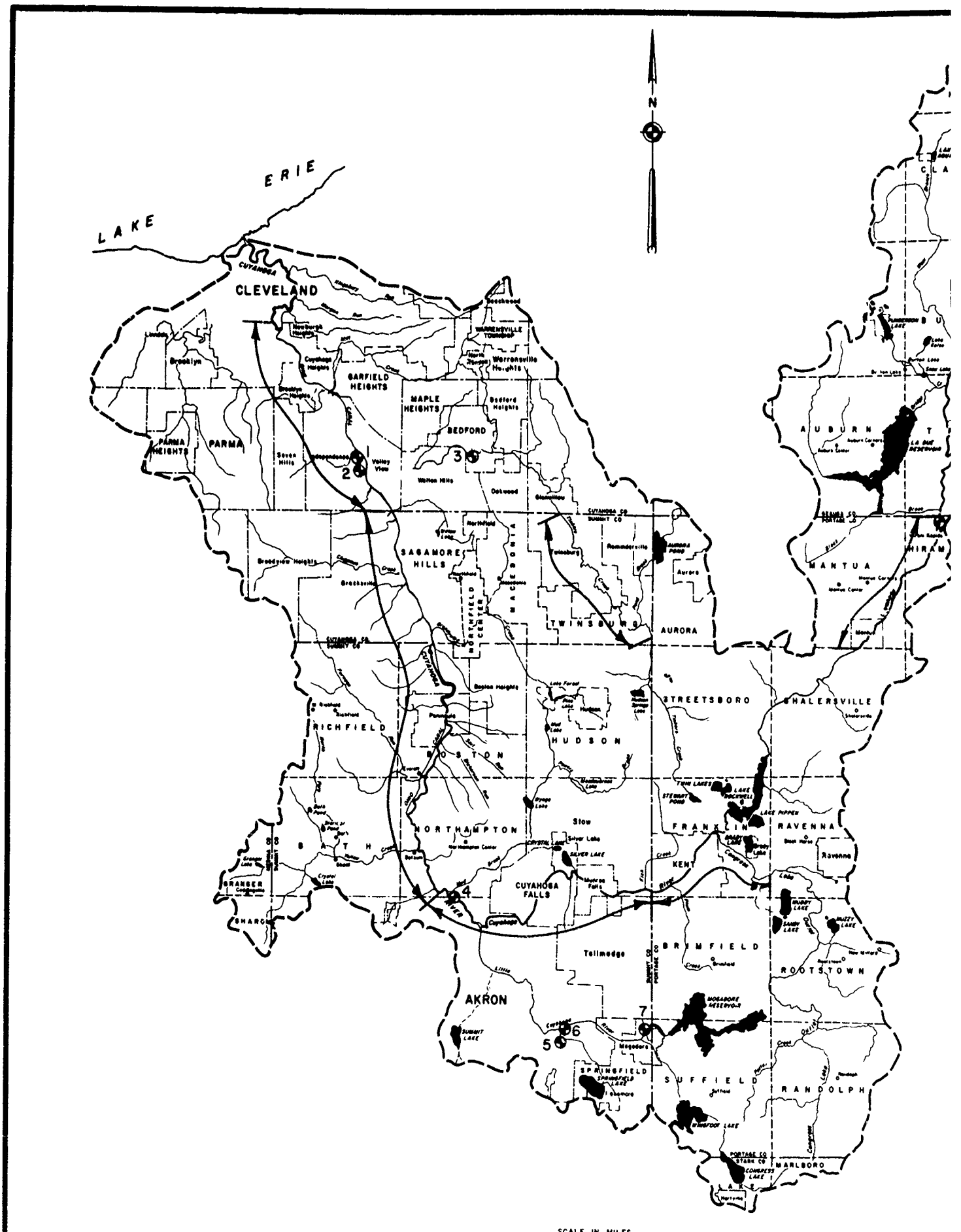
The Buffalo District, Corps of Engineers has initiated preparation of a "Cuyahoga River Restoration Study" to examine the potential and means of restoring the Cuyahoga River to a condition that best fits the environmental needs of the basin. The study will consider the total problems of the basin and recommend alternate solutions to them.

Two water supply reservoirs, LaDue reservoir on Bridge Creek and East Branch reservoir on the Cuyahoga River and Punderson Lake, a recreation facility on a tributary of Bridge Creek are upstream from the study area. Although not flood control reservoirs, they do influence streamflows downstream. The dam at Lake Rockwell, another water supply reservoir, is at the downstream limit of the study area and affects flood levels within the study reach.

Possible Flood Heights - Flood levels that would be reached by the Intermediate Regional and Standard Project Floods are shown on Table 2 in the text. The table gives a comparison of these flood levels with bridge floor, average underclearance and stream bed elevations at the five bridge crossings within the study limits. The water surface profiles for the Intermediate Regional Flood and the Standard Project Flood are shown on Plates 6, 7, and 8 and the flooded area on Plates 3, 4, and 5.

Velocities of Water - During an Intermediate Regional or Standard Project Flood, average channel velocities would vary from about one to ten feet per second. Velocities greater than three feet per second combined with depths of three feet or greater are generally considered hazardous and dangerous to life and property.

Hazardous Conditions - Larger floods can cause hazards to local residents in many ways. Since most floods may occur in the late winter and/or early spring, residents caught within the flood may suffer discomfort from lack of heat for a number of days due to basement flooding which extinguishes furnace fires. Due to the duration and extent of flooding, health problems can develop when septic tanks are inundated and high water backs up sewer lines into basements. Municipal sewage treatment plants are often taxed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TWINSBURG
AURORA
STREETSBORO
HUDSON
RICHFIELD
BOSTON
NORTHAMPTON
CUYAHOGA FALLS
AKRON
Tallmadge
BRIMFIELD
FRANKLIN
KENT
RAVENNA
ROOTSTOWN
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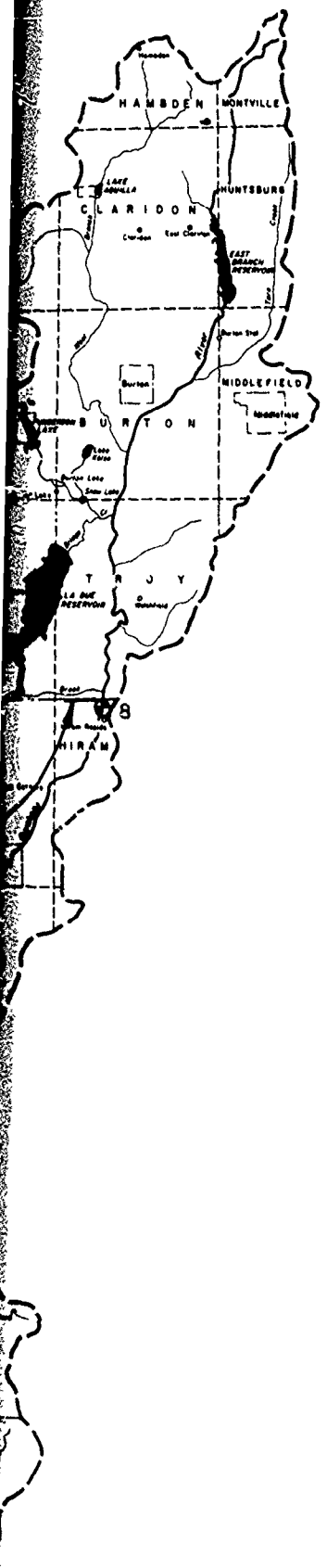
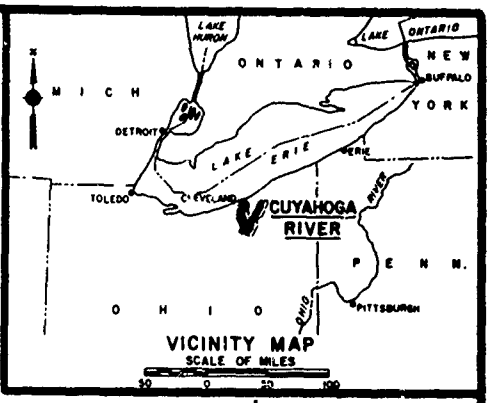




LEGEND:

BLUE LINE INDICATES REACH COVERED BY THIS STUDY.

OTHER AUTHORIZED FLOOD PLAIN INFORMATION STUDIES WITHIN THE CUYAHOGA RIVER BASIN.

U.S.G.S. WATER-STAGE RECORDING GAGE.

1 CUYAHOGA RIVER AT INDEPENDENCE.

2 OHIO CANAL AT INDEPENDENCE

3 TINKERS CREEK AT BEDFORD

4 CUYAHOGA RIVER AT OLD PORTAGE

5 SPRINGFIELD LAKE OUTLET AT AKRON

6 LITTLE CUYAHOGA RIVER AT MASSILLON ROAD, AKRON

7 LITTLE CUYAHOGA RIVER AT MOGADORE

8 CUYAHOGA RIVER AT HIRAM RAPIDS.

CUYAHOGA RIVER
FRANKLIN TWP, CITY OF STREETSBORO AND SHALERSVILLE TWP.
PORTAGE COUNTY, OHIO
FLOOD PLAIN INFORMATION REPORT

BASIN MAP

U.S. ARMY ENGINEER DISTRICT BUFFALO
JUNE 1974

PLATE I

beyond their capacities. Untreated discharge to floodways is made with consequent deposition of waste materials on stream banks and surrounding grounds. Flood waters which overtop roads can cause hazardous driving conditions. The danger from underestimating the velocity and depth of flood waters by unsuspecting children is an age old problem confronting residents within flooded areas.

GENERAL CONDITIONS AND PAST FLOODS

Description of the Area

Physical Setting - The Cuyahoga River flows in a southwesterly direction across Shalersville and in a southerly direction through the City of Streetsboro to Lake Rockwell. The reach of stream and flood plain considered in this report extends a distance of 10.7 miles upstream from the Lake Rockwell Dam in the northeast corner of Franklin Township. The location of the reach of Cuyahoga River covered by this study in relation to the total basin is shown on Plate 1.

Over its total length of 100 miles, the Cuyahoga River rises 718 feet from about elevation 572 feet at its mouth, to elevation 1,290 feet at its source. This results in an average fall of 7.2 feet per mile. Within the 10.7 mile study area however, the Cuyahoga River rises 20 feet which results in an average fall of only 1.9 feet per mile.

The Cuyahoga River drains 809 square miles of which 208 square miles are tributary to Lake Rockwell. Data pertaining to drainage areas and river mile location for the major tributaries within the Cuyahoga River basin are shown on Table 1.

Settlement - When the Cuyahoga River was the republic's northwest boundary, settlement was barely working its way north from the Ohio River. The opening of this territory, called the Western Reserve, was carried out under a land settlement plan conducted by the stockholders of the Connecticut Land Company. In order to break their way into this forested wilderness, settlers depended upon the Cuyahoga River as a waterway.

The territory of Franklin was the first civil organization in what is now Portage County. Originally, it comprised all of the present area of Portage County and parts of Trumbull and Summit Counties and was formed in 1802. The present area of Franklin Township, organized in 1815, was purchased in 1798 and surveyed into lots in 1803. Late in 1805, the Haymaker family settled along the Cuyahoga River at a location later to become known as Franklin Mills.

In the spot now occupied by Kent, there were originally two villages, Upper Village and Lower Village. In addition, the upper village was known as Carthage and the lower village, Franklin Mills. At that time, each village had dammed the river to power their mills. One of the earliest known floods occurred in March, 1833. It was of such tremendous force that it swept away the mills in Franklin Mills.

The complexion of these two mill towns changed after the completion of the Ohio-Pennsylvania Canal in 1840. The Cuyahoga River was widened and dammed to supply water for the canal which diverted nearly the entire flow.

Streetsboro was originally owned by Titus Street who held back his property until after most of the other townships in Portage County had been settled and organized. It was not settled until 1822. In 1825, Street offered 840 acres of land for the construction of the Cleveland to Wellsville turnpike. After its completion in 1827, the population increased enough to formally organize the township. Streetsboro Village was incorporated in 1968 and made coextensive with the township. It attained the status of a city in 1970.

Shalersville was first settled near its center in 1806. It was organized into a township in 1812. The Cuyahoga River was used in this township for power as in other townships when a dam and mill were constructed near the western township line. Similarly, a flood in 1812 destroyed this dam.

Population - Population trends of the political subdivisions in the vicinity of the study area are shown on Figure 1. As the graph indicates, all of the political subdivisions are growing. If these trends continue, the pressure for development in the flood plains will increase.

Factors Affecting Floods and Flood Damages

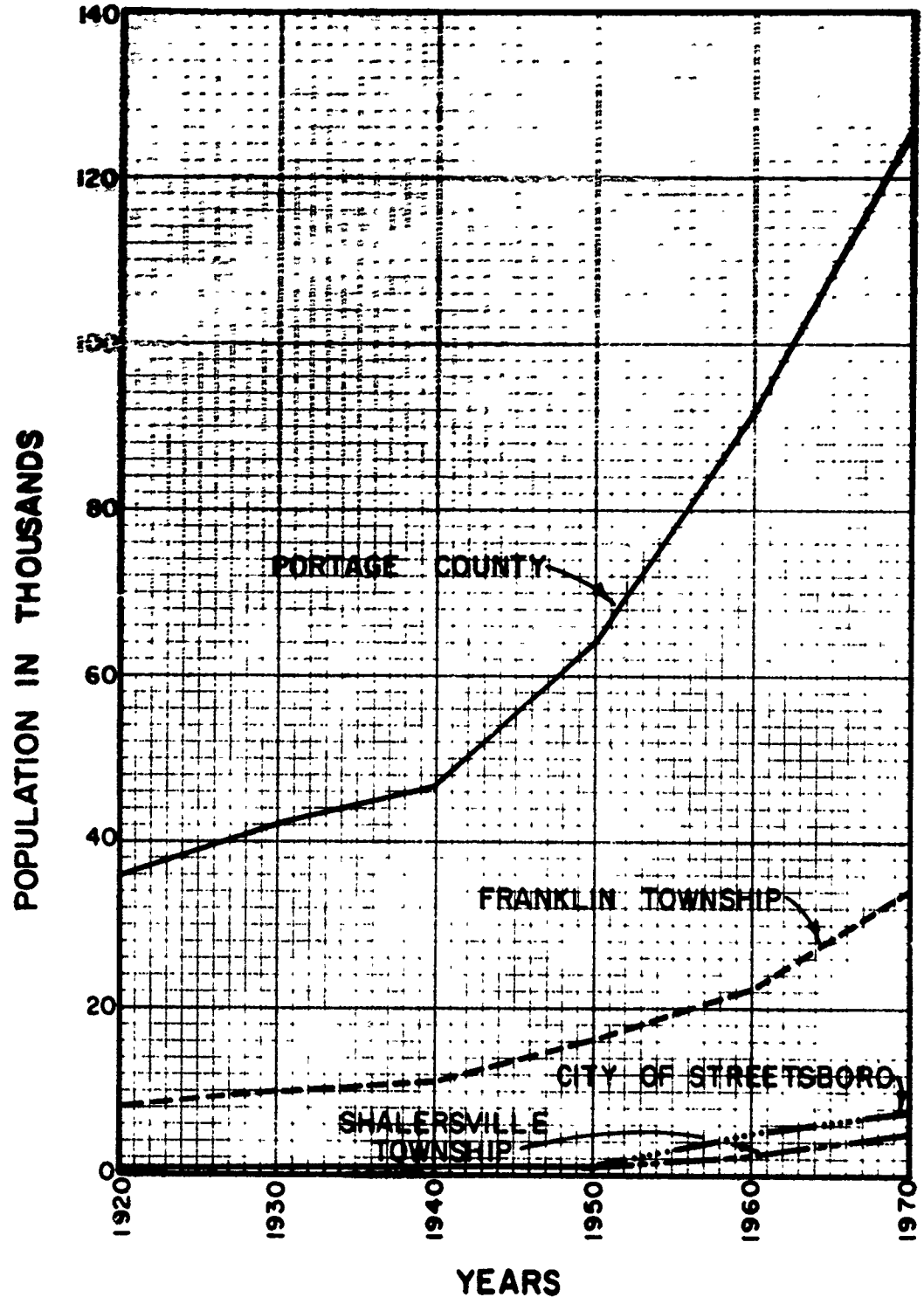
Channel Condition and Development - Within Franklin Township, the study reach extends from Lake Rockwell dam at river mile 58.1 to river mile 60.4. The Cuyahoga River is within Lake Rockwell. Adjacent lands are within the Lake Rockwell Reservation and remain undeveloped.

The City of Streetsboro begins at river mile 60.4 and extends upstream to river mile 63.8. Lake Rockwell extends into the city limits about 1.1 miles. Figure 2 shows the growth along the lake shore. The reservation lands continue to river mile 62.3. Figures 3 and 4 show the growth along the channel and the islands in this reach of the river. Upstream of the reservation lands, Diagonal Road parallels the river on the right and left banks, respectively. Figures 5, 6, and 7 show typical channel conditions between the reservation lands and the upstream city limits.

TABLE 1

DRAINAGE AREAS WITHIN THE CUYAHOGA RIVER BASIN

Location	Distance Upstream From Mouth, Miles	Drainage Area Square Miles	
		Tributary	Main Stem
Main Stem at Mouth	0		809
Big Creek	7.4	37.6	796
Main Stem above Big Creek			749
Mill Creek	11.8	19.5	730
Main Stem above Mill Creek			710
Main Stem at Independence gage	13.9		707
Tinkers Creek	17.3	96	693
Main Stem above Tinkers Creek			597
Chippewa Creek	21.6	17.8	583
Main Stem above Chippewa Creek			565
Brandywine Creek	24.7	27.2	555
Main Stem above Brandywine Creek			[illegible]
Furnace Run	33.5	20.4	[illegible]
Main Stem above Furnace Run			480
Yellow Creek	37.2	[illegible]	474
Main Stem above Yellow Creek			443
Mud Brook	[illegible]	29.3	433
Main Stem above Mud Brook			404
Main Stem at Old Portage gage	40.3		404
Little Cuyahoga River	42.2	61.7	401
Main Stem above Little Cuy. River			340
Fish Creek	52.3	11.5	320
Main Stem above Fish Creek			309
Plum Creek	53.8	13.1	307
Main Stem above Plum Creek			294
Congress Lake Outlet	57.0	78.7	290
Main Stem above Congress Lake Outlet			211
Lake Rockwell near Kent	58.1		208
Main Stem at Hiram Rapids gage	75.8		151
Black Brook at Mouth (including area above dike now tributary to LaDue Reservoir)	76.6	12.6	150
Main Stem above Black Brook			138
Bridge Creek at Mouth	82.9	39.5	122
Main Stem above Bridge Creek			82.4
West Branch Cuyahoga River	84.5	35.8	77.2
Main Stem above West Branch			41.4
Tare Creek	88.2	14.0	35.4
Main Stream above Tare Creek			21.4
East Branch Reservoir	90.6		18.6



POPULATION TRENDS

FIGURE 1

Shalersville Township begins at river mile 63.8 and continues to the end of the study area at river mile 68.75. At the downstream end of this reach is a sand and gravel pit which can be seen in the background of Figure 8. Constriction of the river is caused by several islands as shown in Figures 9 and 10.

A heavy growth of timber and brush similar to that shown in Figures 11, 12, and 15, line the channel banks along this reach of the river. Scattered residential development has taken place in several locations along the river. Figures 13 and 14 show their precarious location in the flood plain.

Obstructions to Flood Flow - Inadequate waterway openings under bridges, and dams and other encroachments and fills in channel and overbank areas are major obstructions to passage of flood flows. Other serious obstructions are bends and irregularities of the channel, heavy brush, weeds and trees on the channel banks and in overbank areas and growth and debris extending into the channel.

Within the study area, there has been little encroachment by man other than Lake Rockwell and highway crossings. Natural obstructions, such as dense growth and trees along the banks and overbank flood plain areas do occur however, as shown in several of the photographs.

Obstructions such as dense growth, debris, and fallen trees in the stream channel can be minimized by channel maintenance and clean up programs. A concentrated effort should be made to prevent throwing of refuse or litter into the stream or along the banks. The local governments should establish a floodway, which is the overbank area and stream channel reasonably required to convey the 100 year frequency flood and, as such, should be kept free of obstructions that would interfere with flows and increase flood heights. Floods have occurred in the past and they will undoubtedly occur again. A floodway provides room for flood flows when they come.

Dams and Bridges - There are three reservoirs that modify the stream flow in the study area. These reservoirs are shown on Plate 1. Lake Rockwell dam is located on the Cuyahoga River about 2 miles northeast of Kent and was constructed by the City of Akron for water supply. It controls about 205 square miles of drainage area and has some modifying effect on flood flows downstream. It is at the downstream limit of the study area.

Five bridges cross the Cuyahoga River in the study area. Figures 16 through 20 show these bridges and Table 2 lists a comparison of pertinent bridge structure elevations to the Intermediate Regional Flood and Standard Project Flood elevations.

FIGURE 2 — Wooded overbank looking downstream left from Route 14 bridge at river mile 60.99.

FIGURE 3 — Looking downstream at small trees on overbank at river mile 61.65.

Channel Conditions in Streetsboro
Photos Taken February 1974

FIGURE 4 — Looking upstream at densely wooded island and northwest bank at river mile 62.00.

FIGURE 5 — Wooded banks and island at river mile 62.35.

Channel Conditions in Streetsboro
Photos Taken February 1974

FIGURE 6 — Looking downstream at southeast overbank at river mile 62.83.

FIGURE 7 — View of wooded banks looking upstream at river mile 62.94.

Channel Conditions in Streetsboro
Photos Taken February 1974

FIGURE 8 — Partially clogged channel with wooded and brush covered banks at river mile 64.14.

FIGURE 9 — Looking upstream at narrow channel around island at river mile 64.14.

Channel Conditions in Shalersville Township
Photos Taken February 1974

FIGURE 10 — View looking downstream from Route 303 bridge at river mile 64.55.

FIGURE 11 — Looking downstream from Ohio Turnpike bridge at river mile 64.79.

Channel Conditions in Shalersville Township
Photos Taken February 1974

FIGURE 12 — View from Coit Road bridge looking downstream at river mile 65.64.

FIGURE 13 — View of wooded bank and overbank looking downstream at river mile 66.59.

Channel Conditions in Shalersville Township
Photos Taken February 1974

FIGURE 14 — Looking southeast at river mile 67.59.

FIGURE 15 — Fallen trees along bank downstream of Infirmary Road bridge at river mile 67.72.

Channel Conditions in Shalersville Township
Photos Taken February 1974

Flood Warning and Forecasting Services - Presently there are no specific flood warning or forecasting services for the Cuyahoga River. However, the study area is well within the effective range of the Weather Surveillance Radar operated continuously by the National Weather Service at the Cleveland and Akron-Canton Airport Stations. Weather Service equipment provides for the early detection of a storm and makes possible immediate radio and television broadcasts of information concerning the predicted path and amount of rainfall.

Existing Regulations - In Ohio, the power to adopt and enforce zoning regulations is delegated to political subdivisions. The enabling statutes are within Chapters 303, 519, and 713 of the Ohio Revised Code. None of the political subdivisions within the study area have such regulations in effect.

Section 1521.14 of the Ohio Revised Code requires all departments and agencies of the State to notify and furnish to the Ohio Department of Natural Resources, Division of Water, information on State facilities which may be affected by flooding. This information is required in order to avoid the uneconomical, hazardous, or unnecessary use of flood plains in connection with State facilities. The amendment further requires that, where economically feasible, departments and agencies of the State and political subdivisions responsible for existing publicly owned facilities, provide flood proofing measures in order to reduce potential flood damage. Through a reorganization of the Department of Natural Resources, the Division of Planning was created which, through its Flood Plain Management Section, is now responsible for implementing this section of the Ohio Revised Code.

Under Executive Order 11296, the Federal government has similar restrictions in that all Federal agencies directly responsible for the construction of Federal facilities must evaluate flood hazards when planning the location of new facilities. In addition, this order requires that Federal agencies responsible for administering Federal grants, loans or mortgage insurance programs evaluate flood hazards in order to minimize potential flood damage and the need for possible future Federal expenditures for flood protection and flood disaster relief.

Aid to Flood Victims - The Disaster Relief Act of 1970 (Public Law 91-606) provides assistance to communities and persons located in flood hazard areas in the event of a declared major disaster. The Act provides for various types of aid prior to, during, and after the disaster.

The National Flood Insurance Act of 1968 (Public Law 90-448) provides Federally subsidized, low-cost flood insurance to property owners in any community that meets the eligibility requirements. In order to obtain flood insurance eligibility, the localities involved must adopt various land use controls and regulations affecting flood plains. The Flood Disaster Protection Act of 1973 (PL 93-234) now requires states and those communities identified as having "special flood hazard" areas, as a condition of future Federal financial assistance, to participate in the flood insurance program.

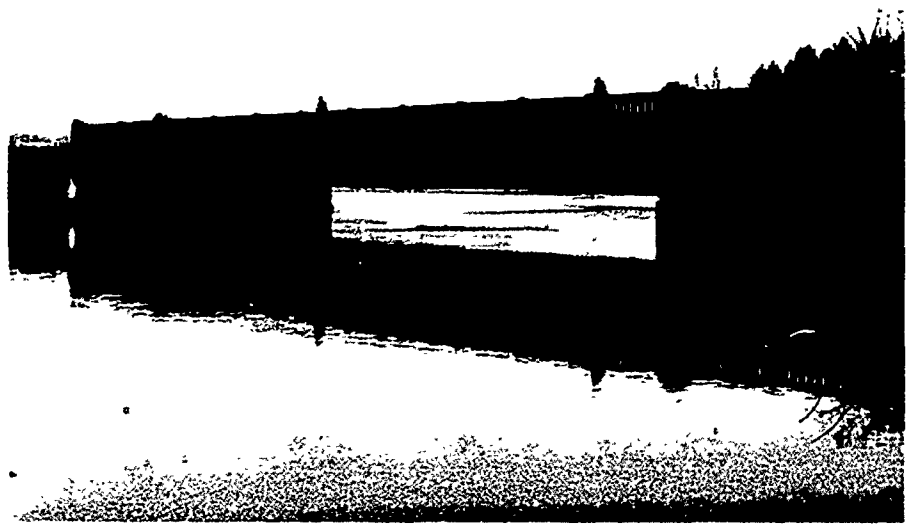


FIGURE 16 — Route 14 bridge at river mile 60.97 looking upstream at downstream face.

FIGURE 17 — Route 303 bridge at river mile 64.55 looking downstream at upstream face.

Highway Bridges
Photos Taken January 1973

FIGURE 18 — Ohio Turnpike bridge at river mile 64.78, looking upstream at downstream face.

FIGURE 19 — Coit Road bridge at river mile 65 64 looking downstream at upstream face.

Highway Bridges
Photos Taken January 1973

FIGURE 20 — Infirmary Road bridge at river mile 67.72 looking downstream at upstream face.

Highway Bridge
Photo Taken February 1974

TABLE 2

BRIDGES ACROSS CUYAHOGA RIVER

Station, miles above mouth	Bridge Identification	Elevation in Feet, U.S.C. & G.S. Datum				
		Approximate Stream Bed	Approximate Low Steel	Approximate Bridge Floor	Intermediate Regional Flood[1]	Standard Project Flood[1]
60.97	State Route 14	1,042.2	1,056.5	1,063.6	1,055.0	1,065.0
64.55	State Route 303	1,064.5	1,081.8	1,084.9	1,073.6	1,081.3
64.78	Ohio Turnpike	1,065.6	1,081.5	1,085.9	1,074.8	1,082.5
65.64	Coit Road	1,068.9	1,082.2	1,086.1	1,078.6	1,088.8
67.72	Infirmary Road	1,069.5	1,082.2	1,085.6	1,083.2	1,091.7

Note: All elevations are referred to U.S.C. & G.S. datum
[1]Elevations refer to upstream side of respective bridge at its centerline.

Record of Floods

Information pertaining to past floods in the study reach of the Cuyahoga River is extremely scarce. Since there are no gaging stations in the study area, the only data available is flood records at the Hiram Rapids gage, 7 miles upstream of the upstream limit of study. Table 3 includes data on the ten highest known floods at that gage. Zero of the gage is at 1,087.46 feet U.S.C. & G.S. datum (unadjusted). The top of bank at the gage site is at 1,090.30 feet, making bankfull stage at 2.84 feet.

TABLE 3

TEN HIGHEST FLOODS AT HIRAM RAPIDS GAGE

Order No.	Date of Crest	Stage[1] feet	Elevation[1] feet	Estimated Peak Discharge, c.f.s
1	January 23, 1959	8.11	1095.57	3,670
2	March 23, 1948	6.94	1094.40	2,760
3	March 19, 1962	6.83	1094.29	2,670
4	March 31, 1960	6.58	1094.04	2,490
5	March 6, 1964	6.57	1094.03	2,480
6	January 27, 1952	6.44	1093.90	2,380
7	January 20, 1929	6.26	1093.72	2,260
8	February 15, 1950	6.13	1093.59	2,170
9	April 26, 1957	6.13	1093.59	2,170
10	December 30, 1969	6.07	1093.53	2,130

[1]Based on existing stage-discharge relationship

FUTURE FLOODS

Great floods have been experienced on streams in the general geographical region of this study. Similar climatological conditions to those causing such large floods could occur over the Cuyahoga River watershed and, in all probability, will occur sometime in the future. The purpose of this section is to delineate those areas that would be inundated by floods of a given magnitude and set forth additional information to help communities develop a plan for reducing the extent of future flood damages.

Extent of Flooding

Intermediate Regional Flood - The Intermediate Regional Flood is defined as a flood having a recurrence interval of once in 100 years at a designated location. However, this is based on a statistical analysis and the flood may actually occur in any year or even in consecutive years. Data for this flood on this reach of the Cuyahoga River is shown in Table 4. The Intermediate Regional Flood is recommended by the State of Ohio Department of Natural Resources as the minimum flood level to define the limits of the regulatory flood plain. That is, development within these limits should be regulated by local ordinances so as to reduce flood damage potential. The Federal Insurance Administration of the Department of Housing and Urban Development uses like criteria for the flood insurance program.

Standard Project Flood - The Corps of Engineers, with the cooperation of the National Weather Service, has made broad and comprehensive studies and investigations of storms and floods and has developed generalized procedures for estimating the flood potential of streams. These procedures have been used in determining the Standard Project Flood, which is defined as the largest flood that can be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the geographical region involved. Only in rare instances would such a storm occur on any specific region. Table 4 summarizes pertinent data for the Standard Project Flood.

There is no frequency assigned to this flood since it is developed from generalized rainfall-runoff data rather than streamflow records. The occurrence of such a flood would indeed be a rare event, however it could occur in any year. This flood is not the maximum flood that could occur, but it does indicate a reasonable upper limit of the flood plain.

Larger Floods - While larger floods are theoretically possible, the usual climatological characteristics required to produce such a flood would seldom exist. The minimum risk from possible future flood damages that a community is willing to accept should be considered in establishing regulatory flood plain limits or planning for development.

Areas and Depths of Flooding - Areas that would be flooded by the Intermediate Regional and Standard Project Floods are delineated on Plates 3, 4, and 5. An index map of the vicinity is shown on Plate 2. The overflow areas were determined with an accuracy consistent with the objectives of the study and accuracy of available data. Actual limits of the flooded areas may vary somewhat from those shown on the map because the 10 foot contour interval and scale of the map do not permit precise plotting of the flooded area boundaries.

Plates 6, 7, and 8 show the water surface profiles for both floods. The depth of flow in the channel can be estimated at any point from these plates. Determination of these flood profiles was predicated on the assumption that all structures would remain in place throughout the flood and that no accumulation of debris would further restrict waterway openings or block the channel.

TABLE 4

INTERMEDIATE REGIONAL AND STANDARD PROJECT FLOOD DISCHARGES AND AVERAGE VELOCITIES

River Mile	Discharge c.f.s.	Average Velocity,[1] feet per second	
		Channel	Overbank
Intermediate Regional Flood			
58.10 - 61.65	5,200[2]	3.0	.7
61.65 - 63.68	6,000	4.7	1.2
63.68 - 64.05	5,800	4.8	1.0
64.05 - 65.47	5,700	4.6	1.0
65.47 - 66.59	5,600	5.1	1.4
66.59 - 68.33	5,400	2.9	1.0
68.33 - 68.75	5,100	2.4	.8
Standard Project Flood			
58.10 - 61.65	22,200	2.5	1.2
61.65 - 63.68	21,200	6.4	2.2
63.68 - 64.05	20,700	7.1	2.3
64.05 - 65.47	20,200	6.9	1.8
65.47 - 66.59	19,700	6.6	2.2
66.59 - 68.33	19,000	4.2	1.8
68.33 - 68.75	18,300	3.2	1.4

[1]Average velocities within the indicated reach of the river.
[2]Discharge from Lake Rockwell reduced because of storage effect.

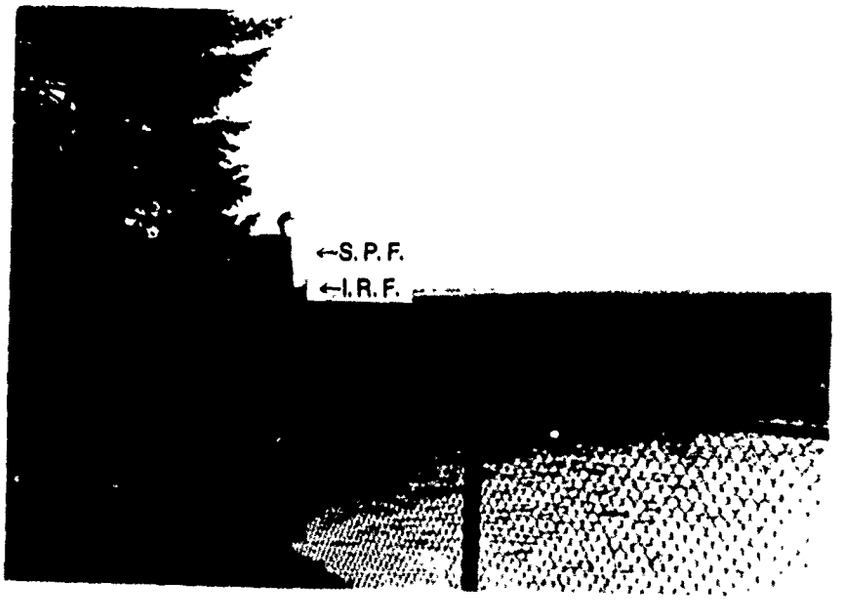


FIGURE 21 — Heights of the Standard Project and Intermediate Regional Floods are shown by the arrows on Lake Rockwell dam at river mile 58.1.

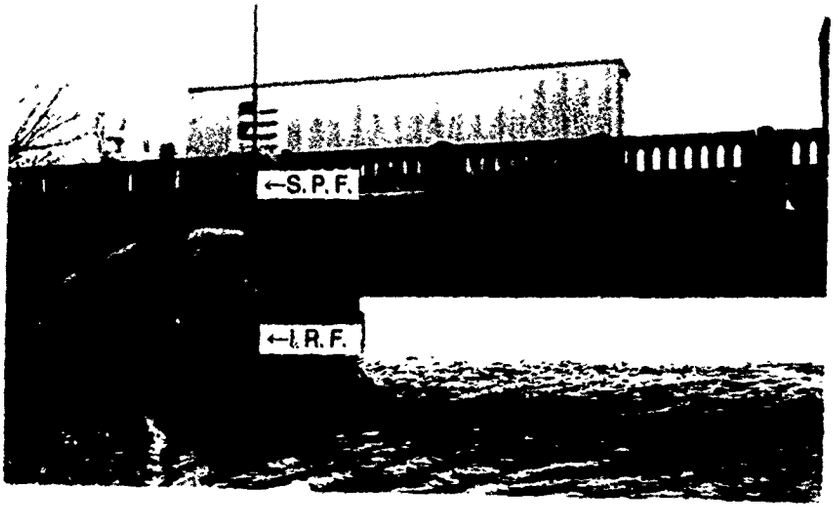


FIGURE 22 — Arrows indicate heights of the Standard Project and Intermediate Regional Floods on State Route 14 bridge at river mile 60.97.

Possible Future Flood Heights
Photos Taken May 1974

FIGURE 23 — Heights of flooding are shown by the arrows for the Standard Project Flood and Intermediate Regional Flood on Coit Road bridge at river mile 65.64.

FIGURE 24 — Heights of the Standard Project and Intermediate Regional Floods are shown by the arrows on this home on Infirmary Road at river mile 67 6.

Possible Future Flood Heights
Photos Taken May 1974

The lateral extent of channel overflow at typical cross sections is shown on Plates 9 and 10. Depth of flow outside of the channel resulting from either flood can be estimated from these illustrations.

Approximate depths of flooding that would be experienced within the flood plain of the Cuyahoga River covered by this report by the occurrence of the Intermediate Regional and the Standard Project Floods are shown in Figures 21 through 24, inclusive.

Velocity of Flood Waters - Average velocity of flood water depends on the size and shape of the cross section, conditions of the stream and the bed slope of the channel, all of which vary along the stream. Table 4 lists the average velocities that may be expected for peak discharges of the Standard Project and Intermediate Regional Floods. Velocities greater than 3 feet per second combined with depths of 3 feet or greater are generally considered hazardous to life and property.

The accumulation of ice or debris at constricted sections of the channel may affect the characteristics of flood flow. Such accumulation acts as a dam and causes water to back up forming a pond. If sufficient head accumulates to break the dam, a surge of water would flow downstream causing an increase in both the discharge and velocity values. Since the occurrence and amount of accumulation are indeterminate factors, the values in Table 4 do not reflect such conditions.

Reducing the Damages

The information contained in this report will not by itself reduce the flood damage potential. Local action will be required to implement a flood plain management program in order to curb the rise of potential flood damages. Although specific plans are not set forth for the study area, several agencies provide assistance to the local sector in developing a workable plan for reduction of flood damages and wise use of the flood plains.

State Assistance - The Flood Plain Management Section of the Division of Planning of the Ohio Department of Natural Resources administers Ohio's flood plain management program. The major objective of the program is to ens e the wise use of Ohio's flood plain areas. They perform various functions including coll ction of flood data, special analysis of flood hazard sites, and development of model ordinances and regulations for flood plain use.

This program is directed at the local level since the power to control the use of flood plains lies with the local governments in Ohio. Technical data and planning assistance are provided to local communities requesting help. The Flood Plain Management Section is also the State Coordinating Agency for the National Flood Insurance Program. Information is provided on the insurance program and local communities are assisted in establishing eligibility for flood insurance.

Federal Assistance - The Department of Housing and Urban Development administers the National Flood Insurance Program. Currently none of the communities in the study area are eligible. Both U.S. Soil Conservation Service and the U.S. Geological Survey are active in and coordinate flood control programs with the State.

The Corps of Engineers also maintains a Flood Plain Management Services program. Information, guidance, and advice on flood hazards and the wise use of flood plains are available to Federal, State, and local agencies. The program includes preparation of this and other flood plain information studies and provision of technical assistance for the collection, preparation, and analysis of flood data. Guidelines and pamphlets pertaining to flood plain regulations, flood proofing, and other related subjects are available to public and governmental interests. Comprehensive flood damage prevention planning is also available through this program.

To assist local governments in managing and controlling their flood plains, the U.S. Army Corps of Engineers has prepared and will, upon request, distribute to State, county, and local governments copies of pamphlets entitled, "Guidelines for Reducing Flood Damages" and "Introduction to Flood Proofing." These pamphlets together with information presented in this report should provide a base upon which local governments may develop a sound program to reduce damage to existing and future development within the flood plain of the Cuyahoga River in Portage County, Ohio. Figure 25 lists the corrective and preventive measures described in the above mentioned pamphlets. The U.S. Army Corps of Engineers will distribute to State, county, and local governments other helpful pamphlets as well as additions to existing pamphlets as they are developed.

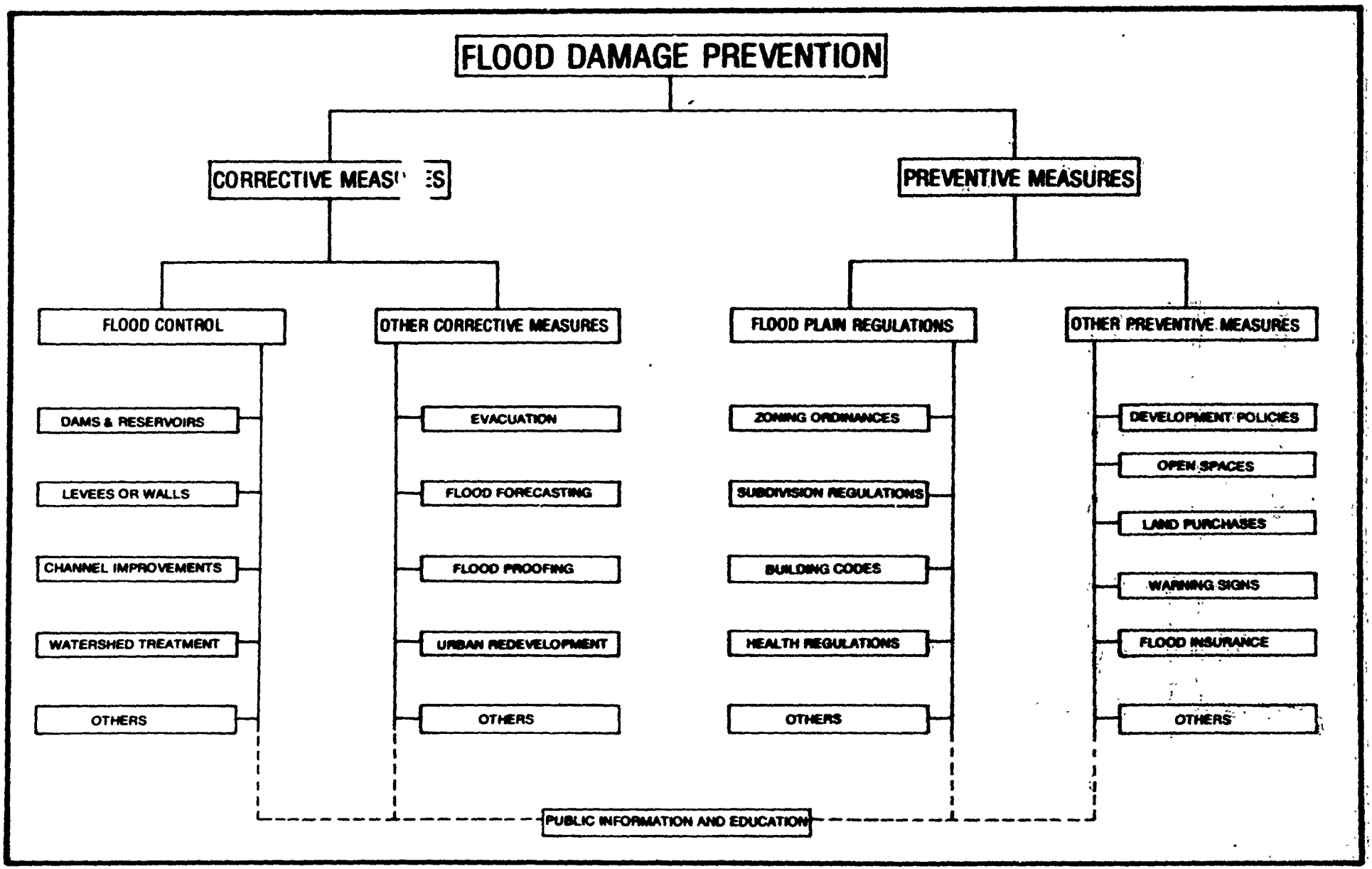


FIGURE 25

Flood damage prevention measures

GLOSSARY OF TERMS

Discharge. The quantity of flow in a stream at any given time, usually measured in cubic feet per second (cfs).

Flood. An overflow of lands not normally covered by water and that are used or usable by man. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river or stream or an ocean, lake, or other body of standing water.

Normally a "flood" is considered as any temporary rise in streamflow or stage, but not the ponding of surface water that results in significant adverse effects in the vicinity. Adverse effects may include damages from overflow of land areas, temporary backwater effects in sewers and local drainage channels, creation of unsanitary conditions or other unfavorable situations by deposition of materials in stream channels during flood recessions, rise of groundwater coincident with increased streamflow, and other problems.

Flood Crest. The maximum stage or elevation reached by the waters of a flood at a given location.

Flood Peak. The maximum instantaneous discharge of a flood at a given location. It usually occurs at or near the time of the flood crest.

Flood Plain. The relatively flat area or lowlands adjoining the channel of a river, stream or watercourse or ocean, lake, or other body of standing water, which has been or may be covered by flood water.

Flood Profile. A graph showing the relationship of water surface elevation to location, the latter generally expressed as distance measured from above the mouth of a stream of water flowing in an open channel. It is generally drawn to show surface elevation for the crest of a specific flood, but may be prepared for conditions at a given time or stage.

Flood Stage. The stage or elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.

Head Loss. The effect of obstructions, such as narrow bridge openings or buildings that limit the area through which water must flow, raising the surface of the water upstream from the obstruction.

Hydrograph. A curve denoting the discharge or stage of flow over a period of time.

Intermediate Regional Flood. A flood having an average frequency of occurrence in the order of once in 100 years although the flood may occur in any year. It is based on statistical analyses of streamflow records available for the watershed and analyses of rainfall and runoff characteristics in the "general region of the watershed."

Left Bank. The bank on the left side of a river, stream, or watercourse, looking downstream.

Low Steel (or Underclearance). See "underclearance."

Right Bank. The bank on the right side of a river, stream, or watercourse, looking downstream.

Standard Project Flood. The flood that may be expected from the most severe combination of meteorological and hydrological conditions that is considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations. Such floods, as used by the Corps of Engineers are intended as practicable expressions of the degree of protection that should be sought in the design of flood control works, the failure of which might be disastrous.

Underclearance. The lowest point of a bridge or other structure over or across a river, stream, or watercourse that limits the opening through which water flows. This is referred to as "low steel" in some regions.

AUTHORITY, ACKNOWLEDGMENTS AND INTERPRETATION OF DATA

This report has been prepared by Burgess & Niple, Limited under the direction of the Buffalo District of the U.S. Army Corps of Engineers in accordance with the authority granted by Section 206 of the Flood Control Act of 1960 (PL 86-465) as amended.

* * *

Assistance and cooperation of Federal, State, and local agencies in supplying useful information are appreciated.

* * *

The Buffalo District will provide, upon request, interpretation and limited technical assistance in the application of these data, particularly as to their use in developing effective flood plain regulations. Requests should be coordinated through the Ohio Department of Natural Resources, Division of Planning, Flood Plain Management Section. After local authorities have selected the flood magnitude or frequency to be used as the basis for regulation, further information on the effects of various widths of floodway on the profile of the selected flood can be provided to assist in final selection of floodway limits.

BENCH MARKS[1] ON CUYAHOGA RIVER IN FRANKLIN TOWNSHIP, CITY OF STREETSBORO AND SHALERSVILLE TOWNSHIP PORTAGE COUNTY, OHIO

Bench Mark Designation & Approximate River Mile	Elevation[2] Feet on U.S.C. & G.S. Datum	Description
Bridge 1 60.97	1063.02	A chiseled square on top of concrete abutment at upstream right bank of Route 14 bridge.
Bridge 2 64.55	1089.00	A chiseled square on top of concrete abutment at upstream left bank of Route 303 bridge.
133 CWL 1952 64.55	1098.43	A concrete post standard tablet, 49 ft. north of State Route 303 and 108 feet west of entrance to Riverside Cemetery.
Bridge 3 64.78	1087.58	A chiseled square on top of concrete guard wall at upstream left bank of west bound lane of Ohio Turnpike bridge.
Bridge 4 65.64	1086.56	A chiseled square on top of concrete abutment at downstream left bank of Coit Road bridge.
Bridge 5 67.72	1085.16	A chiseled cross on top of concrete abutment at upstream right bank of Infirmary Road bridge.

[1]Bench Mark - A point of known elevation, usually a mark cut into some durable material as stone or concrete, to serve as a reference point in running a line of levels for the determination of elevations. The list is furnished as an aid to local interests in setting minimum elevations for future development or establishing other elevations necessary to flood plain planning.

[2]Elevations established by Corp of Engineers during field surveys in January 1971 and January, February 1973 and recorded in field books Clev.-426 and Clev.-451.

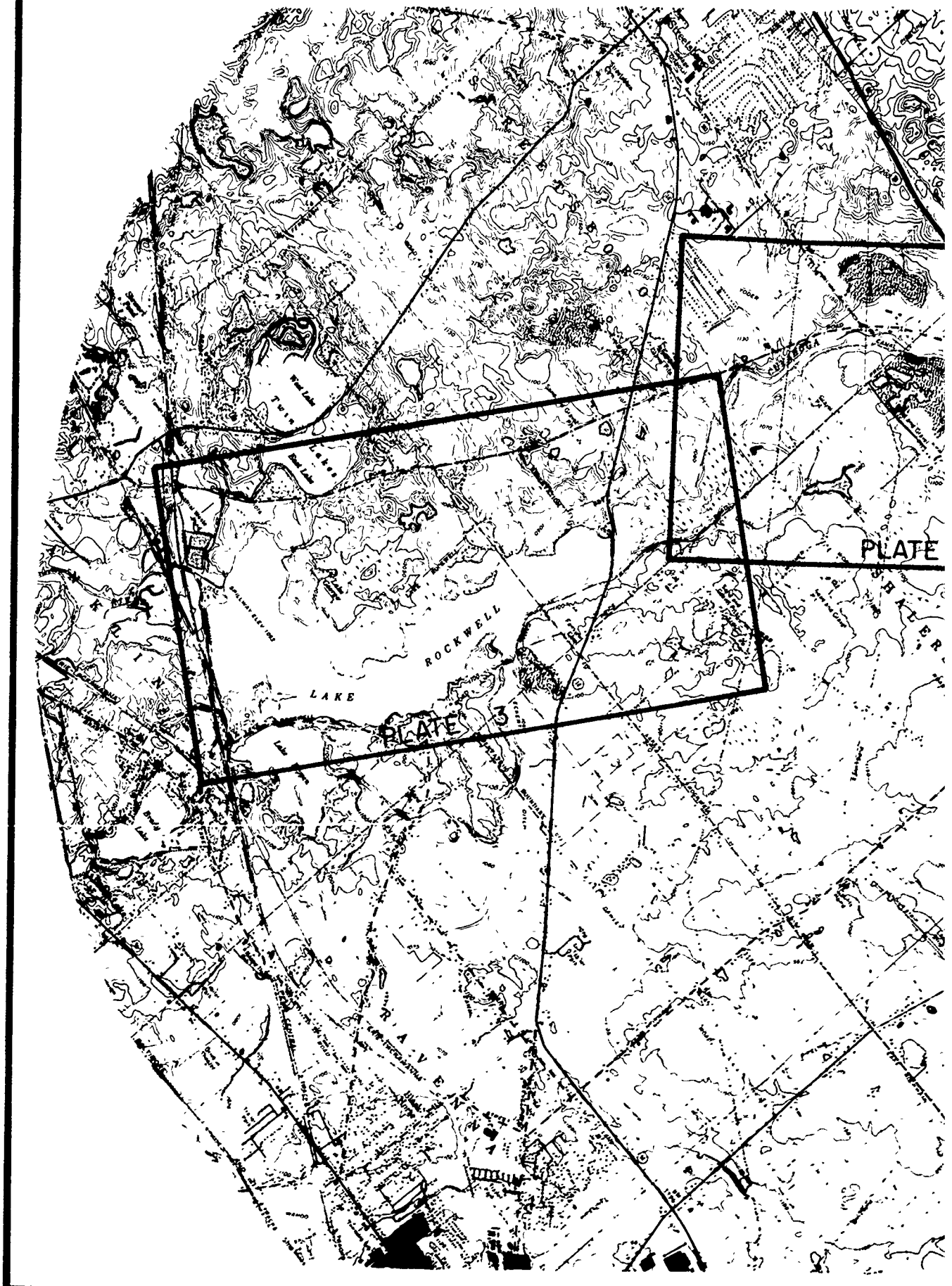


PLATE
ROCKWELL
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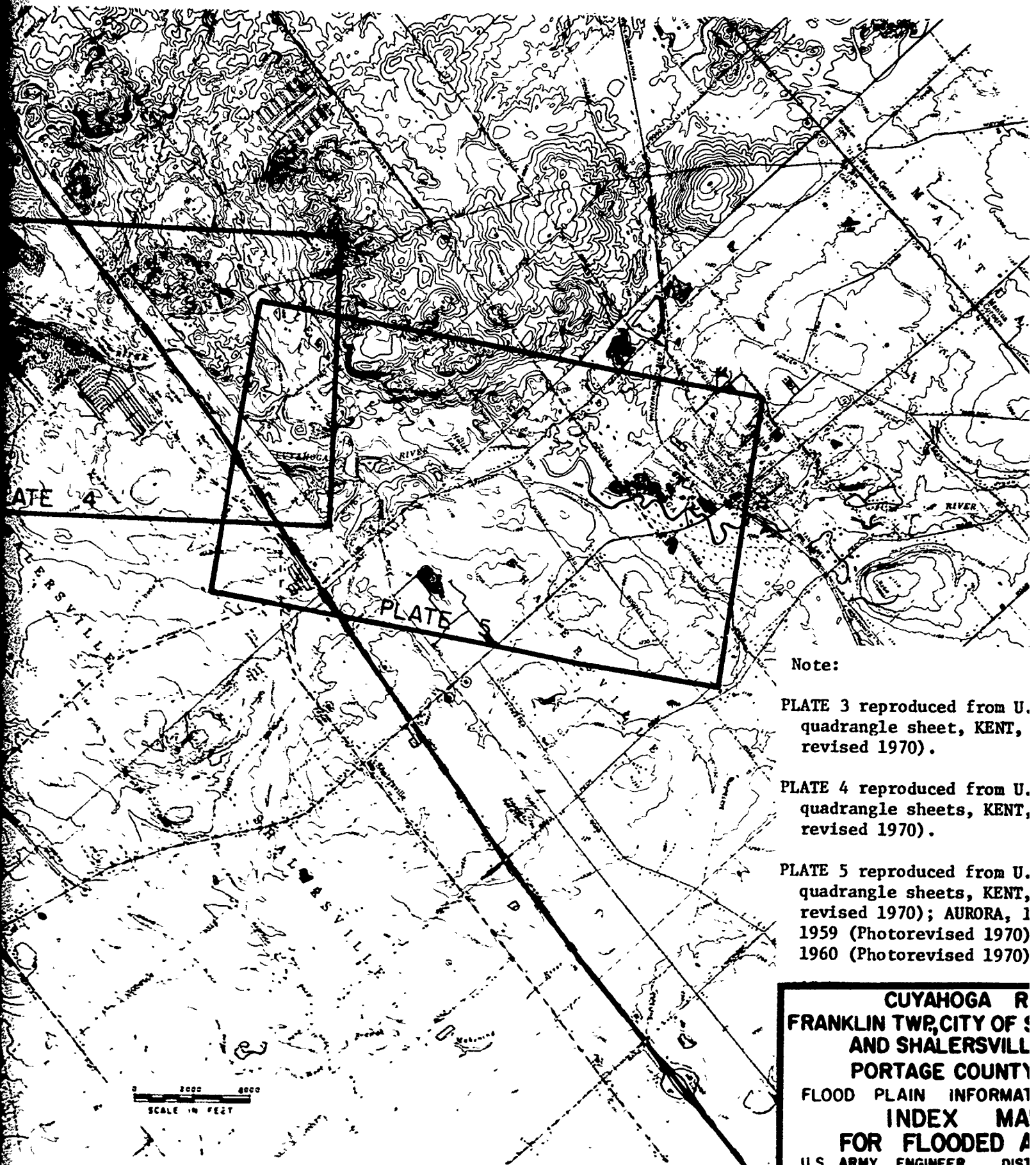
PLATE 3



Note:

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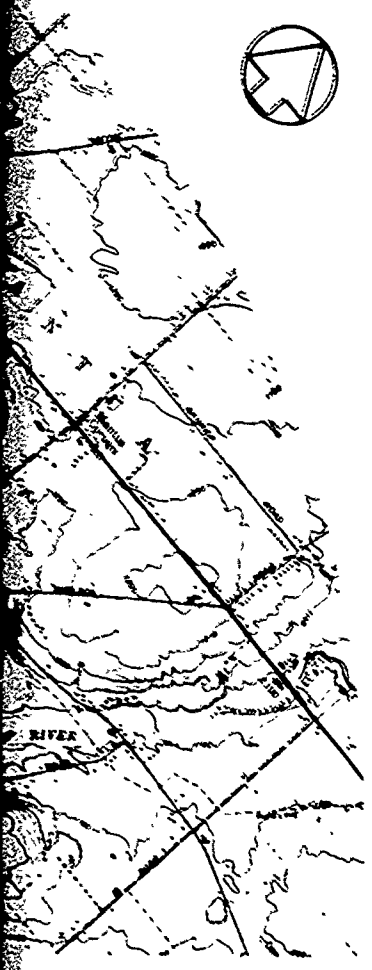

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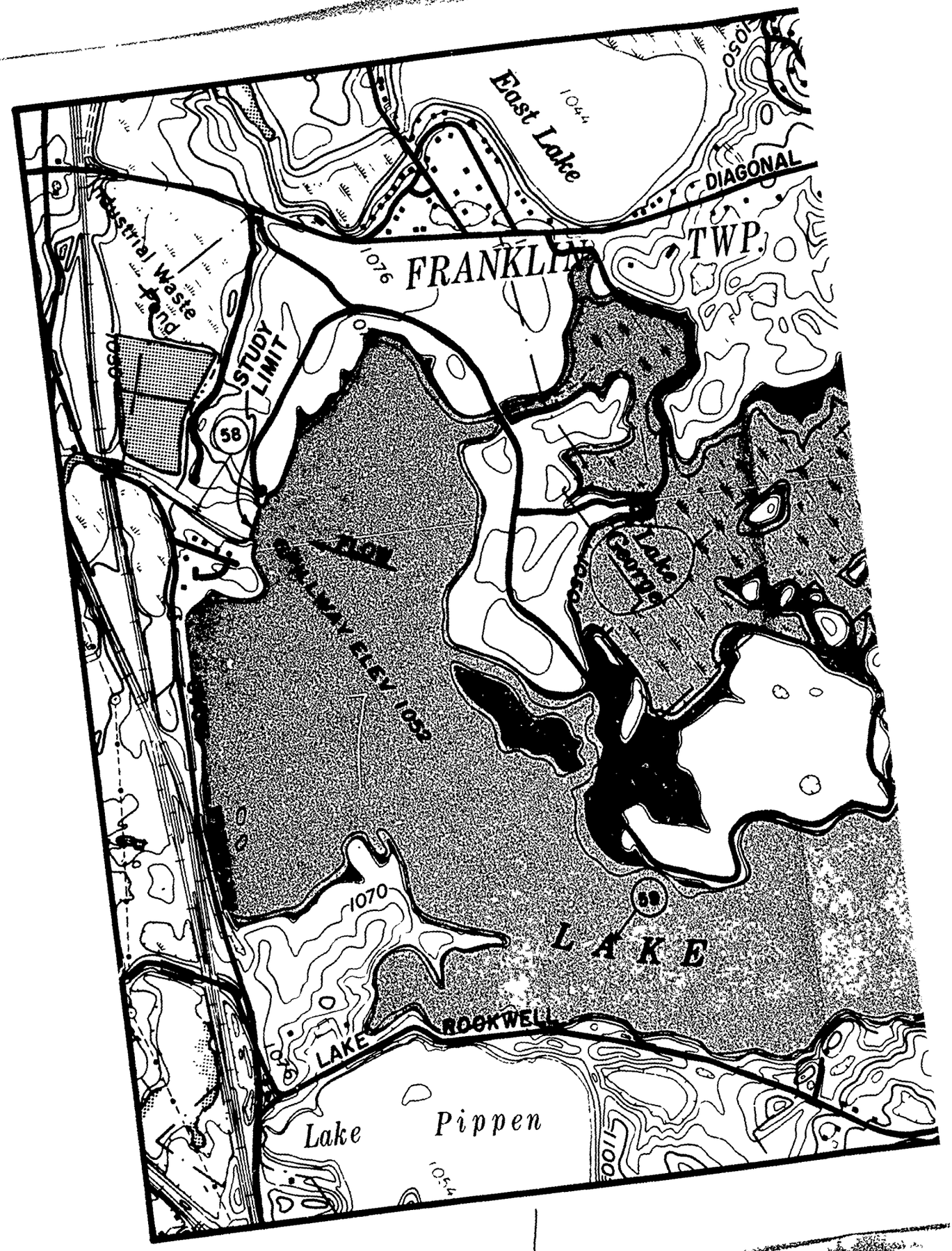
JUNE 1974

PLATE 2


East Lake
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Lake Pippen
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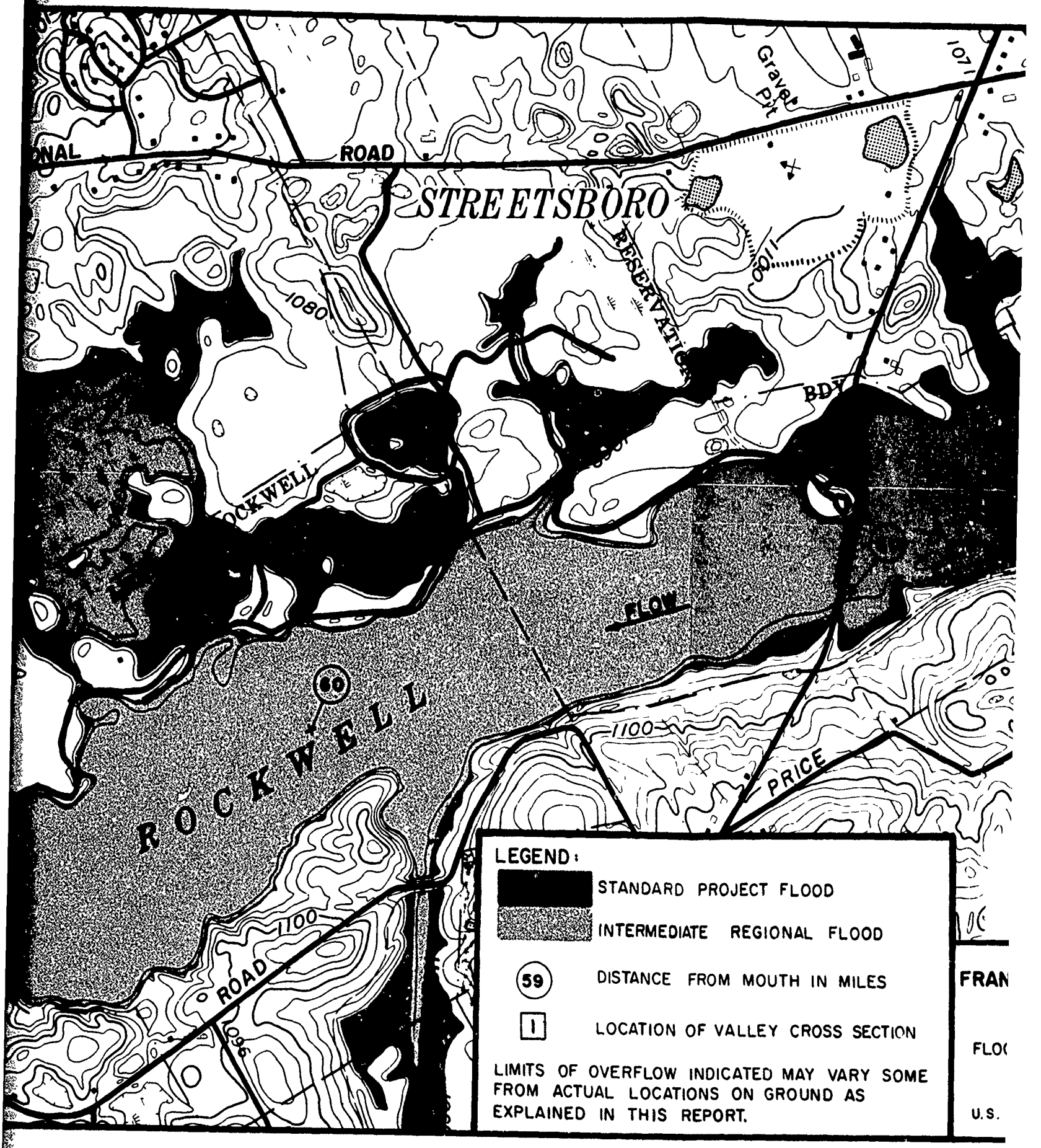
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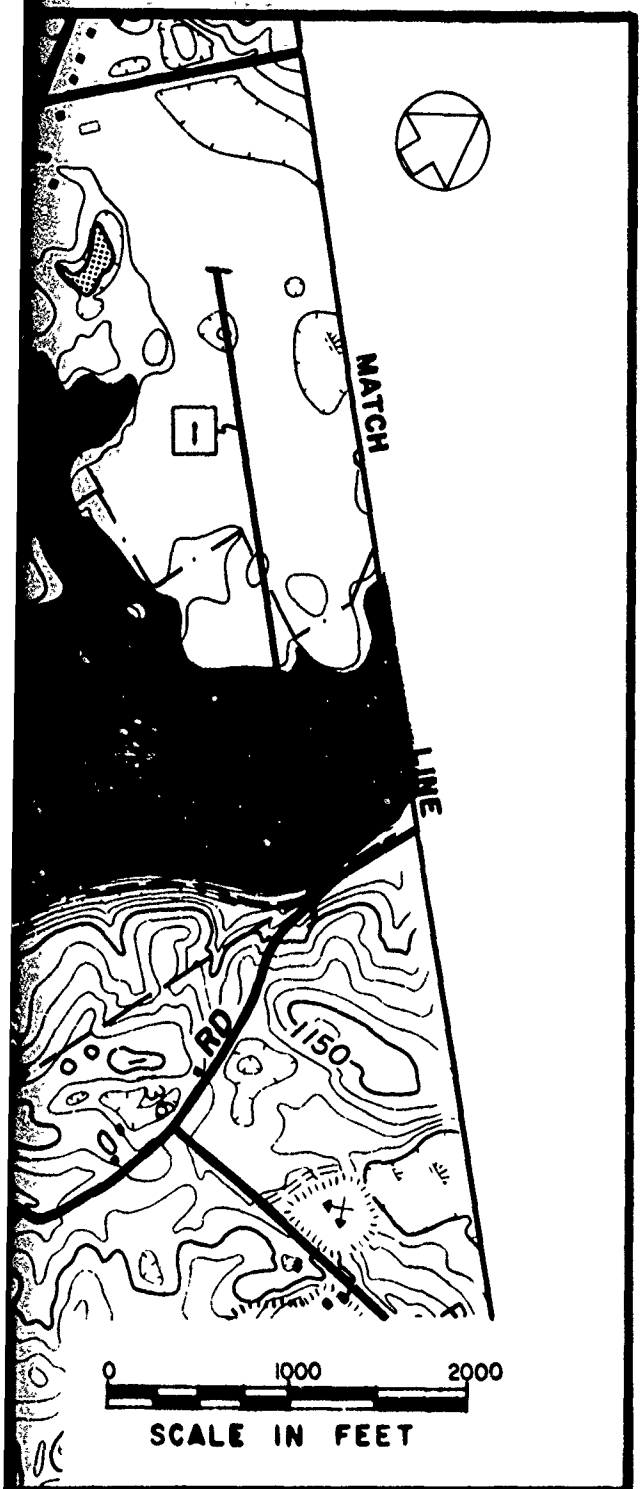
INTERMEDIATE REGIONAL FLOOD
59 DISTANCE FROM MOUTH IN MILES
1 LOCATION OF VALLEY CROSS SECTION
LIMITS OF OVERFLOW INDICATED MAY VARY SOME FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THIS REPORT.



CUYAHOGA RIVER
FRANKLIN TWP., CITY OF STREETSBORO AND SHALERSVILLE TWP.
PORTAGE COUNTY, OHIO

FLOOD PLAIN INFORMATION REPORT

FLOODED AREA
MILE 58.10 TO 61.80

U.S. ARMY ENGINEER DISTRICT BUFFALO
JUNE 1974

PLATE 3

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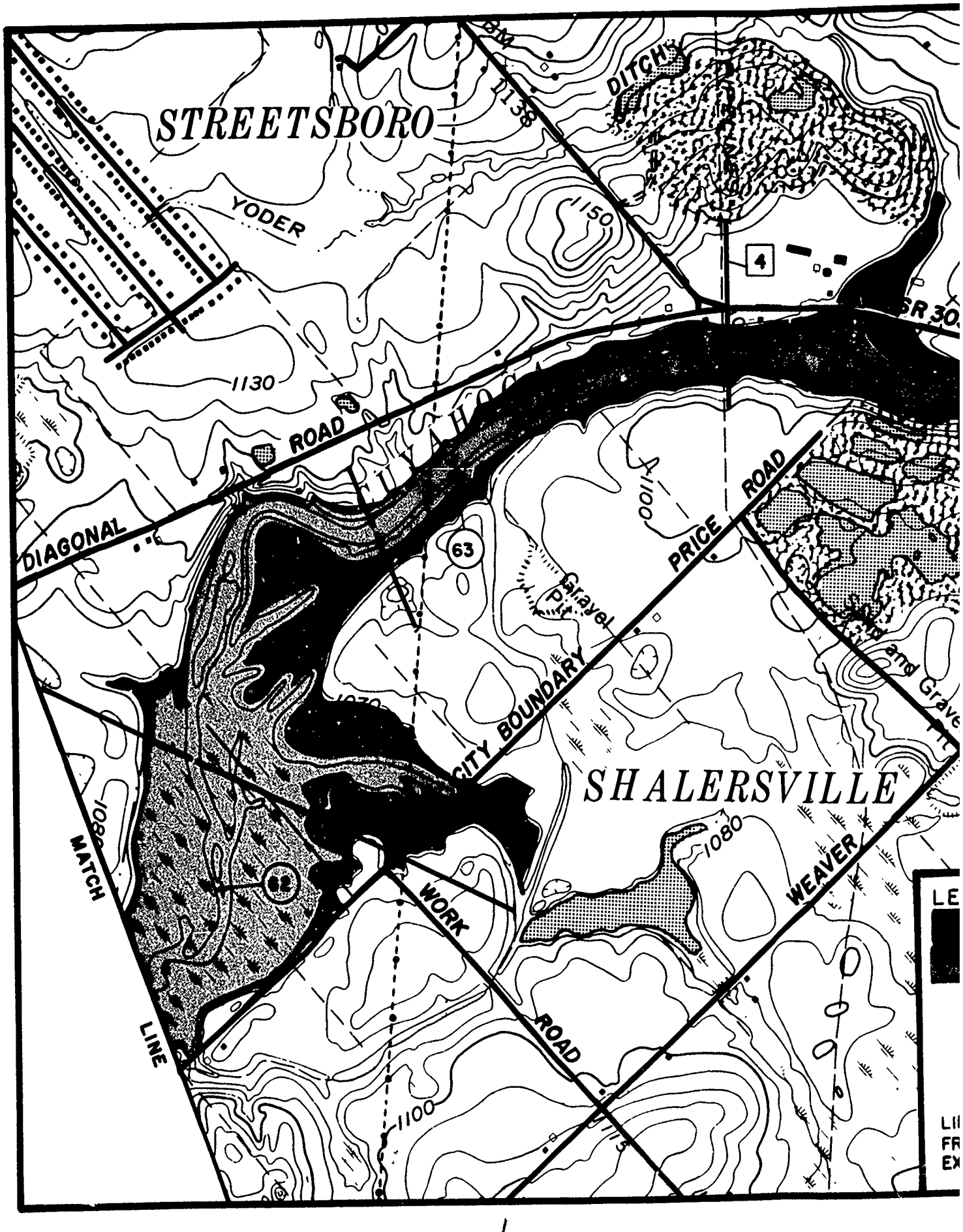
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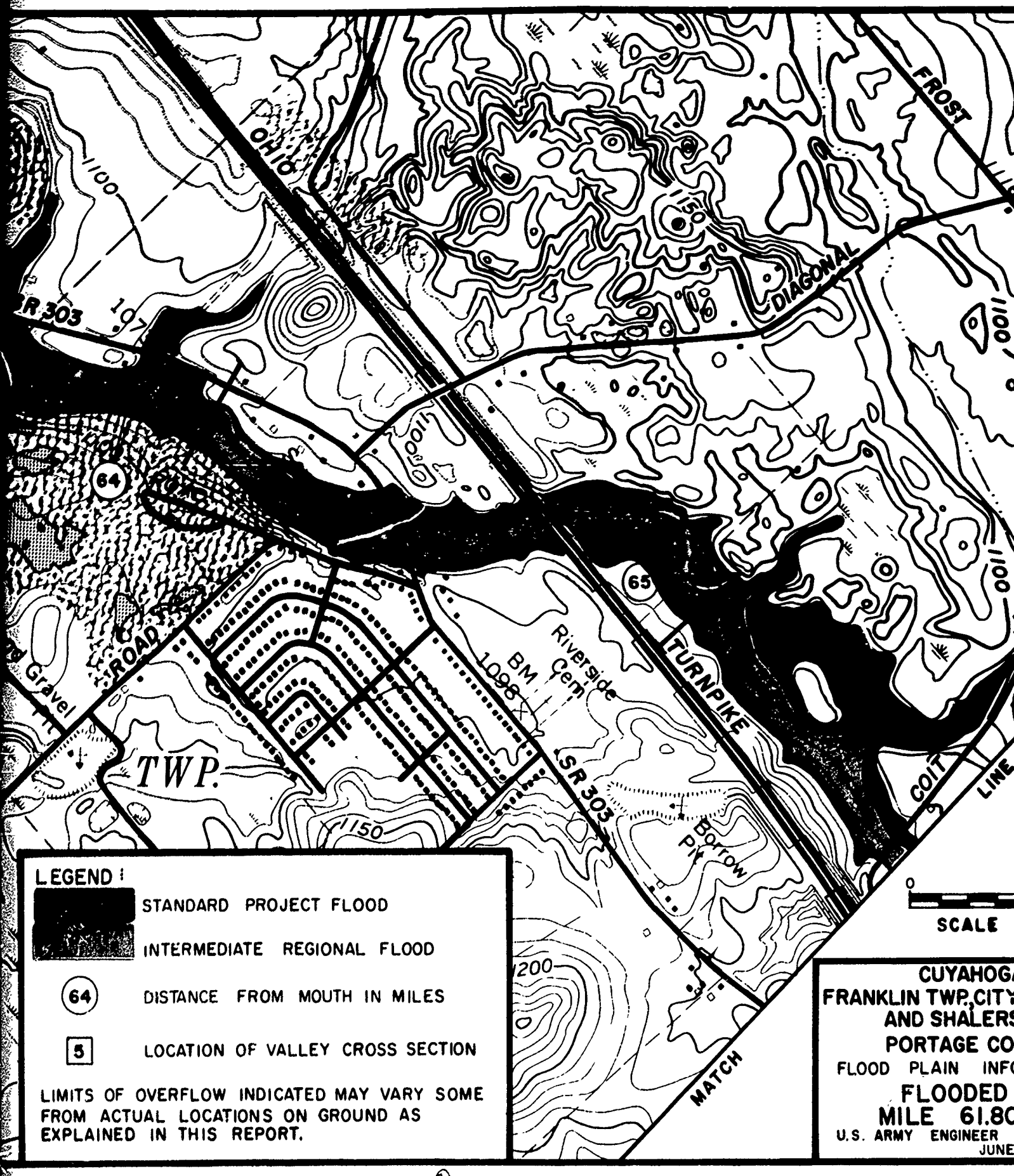

LEGEND :

STANDARD PROJECT FLOOD

INTERMEDIATE REGIONAL FLOOD

(64) DISTANCE FROM MOUTH IN MILES

[5] LOCATION OF VALLEY CROSS SECTION

LIMITS OF OVERFLOW INDICATED MAY VARY SOME FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THIS REPORT.

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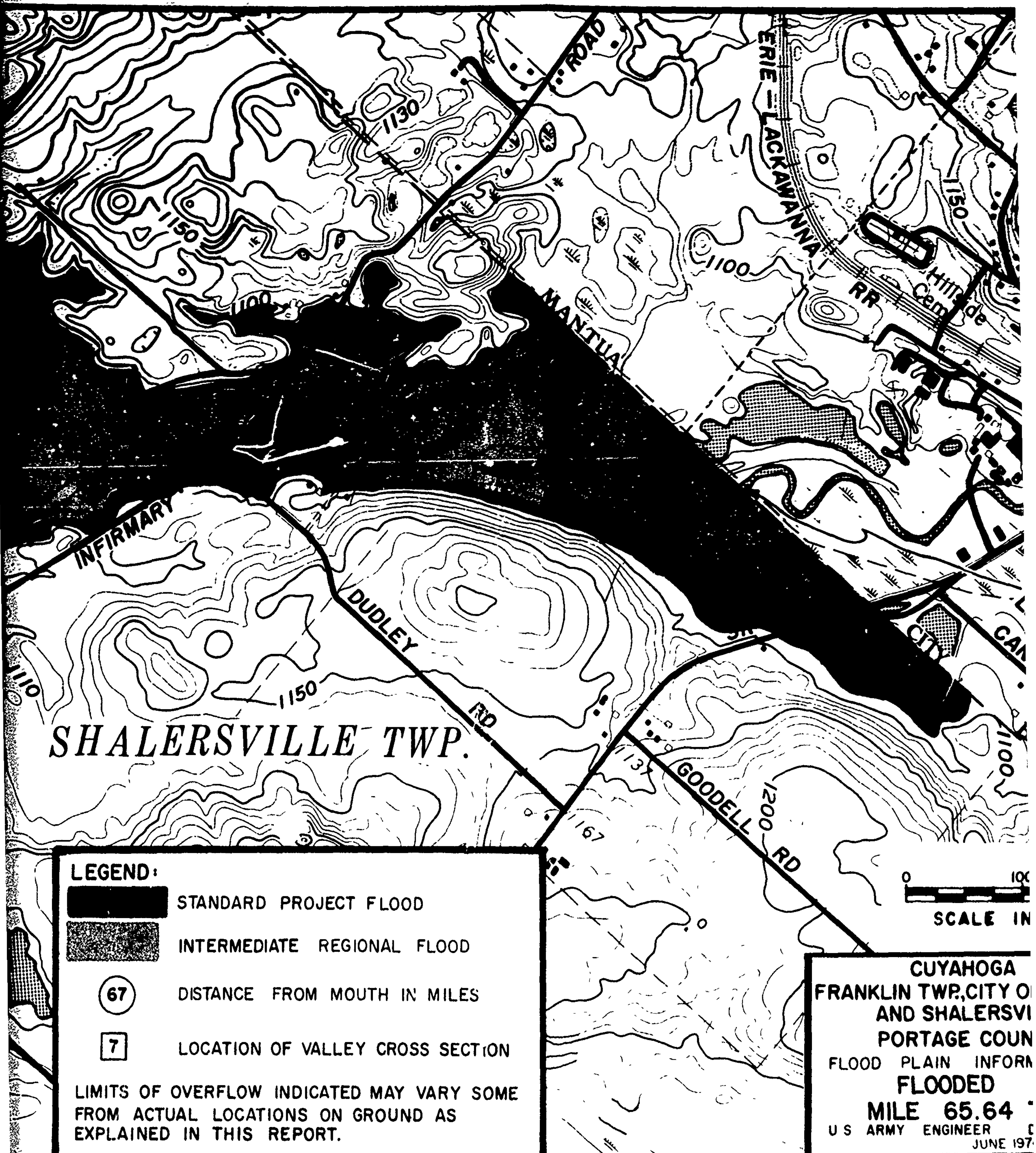
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INTERMEDIATE REGIONAL FLOOD
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7 LOCATION OF VALLEY CROSS SECTION
LIMITS OF OVERFLOW INDICATED MAY VARY SOME FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THIS REPORT.
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JUNE 1974

PLATE 5

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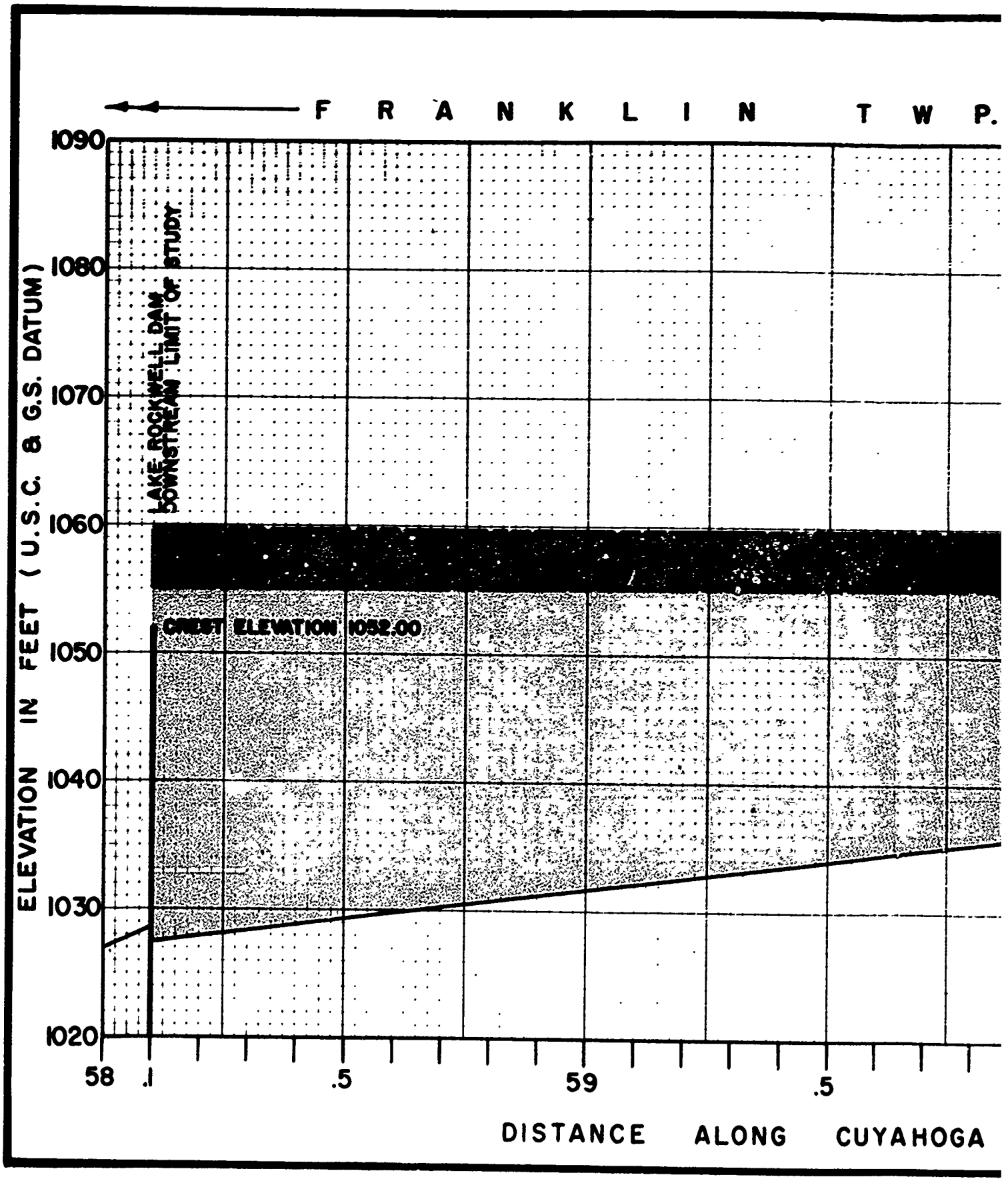
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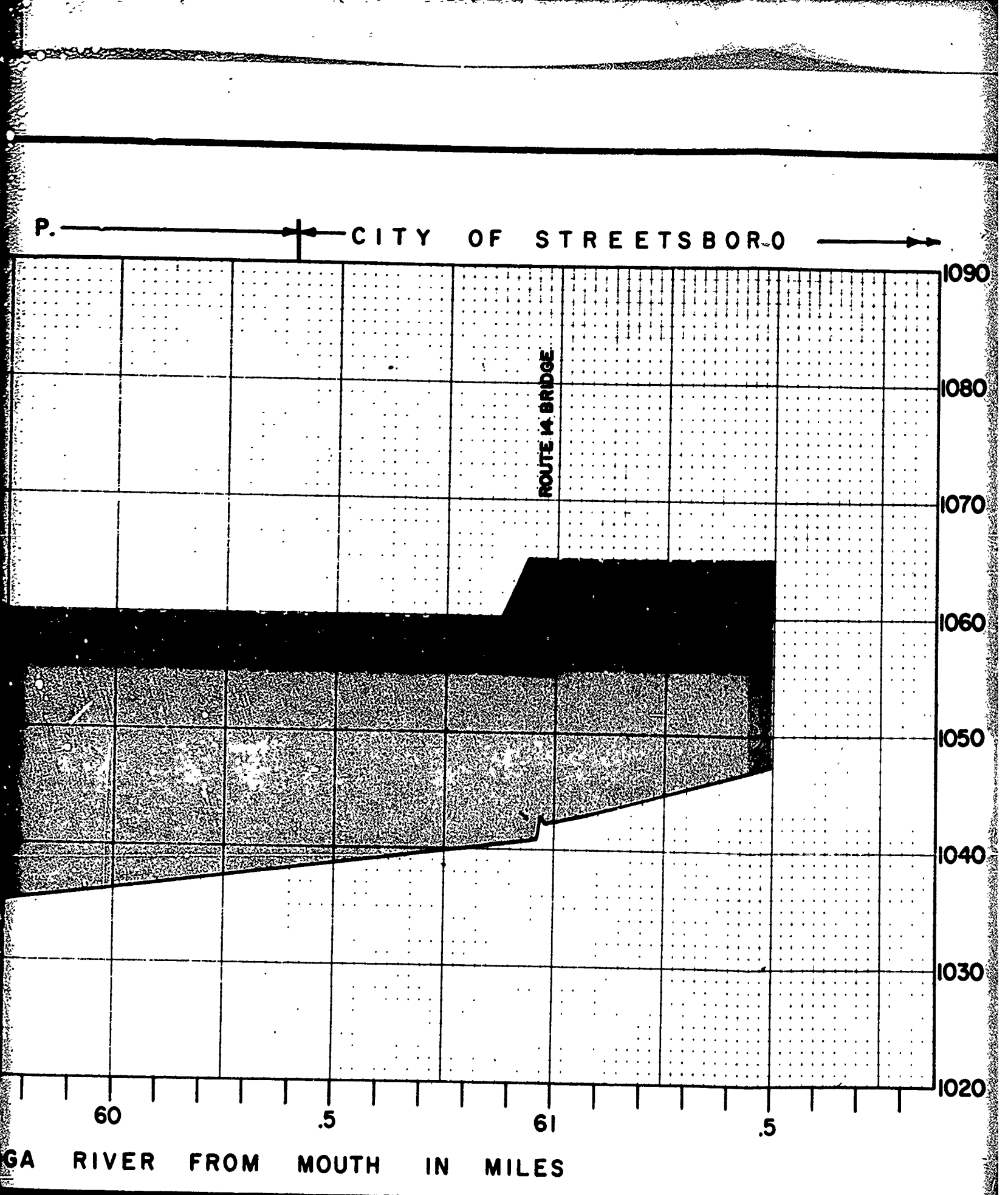
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GA RIVER FROM MOUTH IN MILES

LEGEND

STANDARD PROJECT FLOOD

INTERMEDIATE REGIONAL FLOOD

APPROXIMATE STREAM BED

APPROXIMATE BRIDGE FLOOR ELEVATION

APPROXIMATE LOW STEEL ELEVATION

NOTES

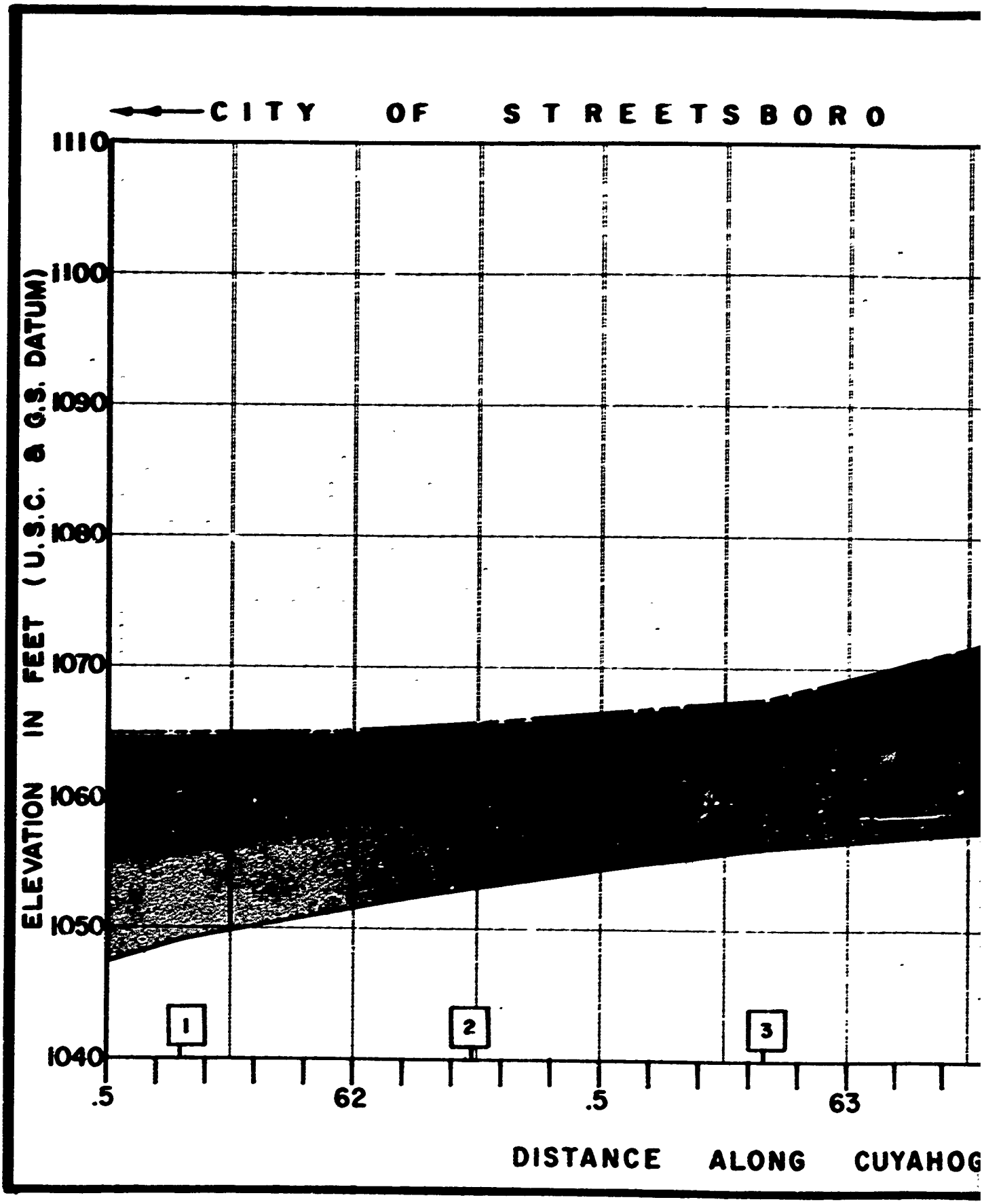
FLOOD PROFILES ARE BASED ON THE FOLLOWING:

1. EXISTING CHANNEL CONDITIONS
2. EXISTING STRUCTURES
3. EXISTING CONDITIONS OF DEVELOPMENT

LARGE SCALE FILLING WILL RAISE PROFILES UNLESS SUFFICIENT FLOODWAY IS PROVIDED

CUYAHOGA RIVER
FRANKLIN TWP., CITY OF STREETSBORO AND SHALERSVILLE TWP.
PORTAGE COUNTY, OHIO
FLOOD PLAIN INFORMATION REPORT
PROFILE
MILE 58.10 TO 61.50
U.S. ARMY ENGINEER DISTRICT BUFFALO
JUNE 1974

PLATE 6


CITY OF STREETSBORO
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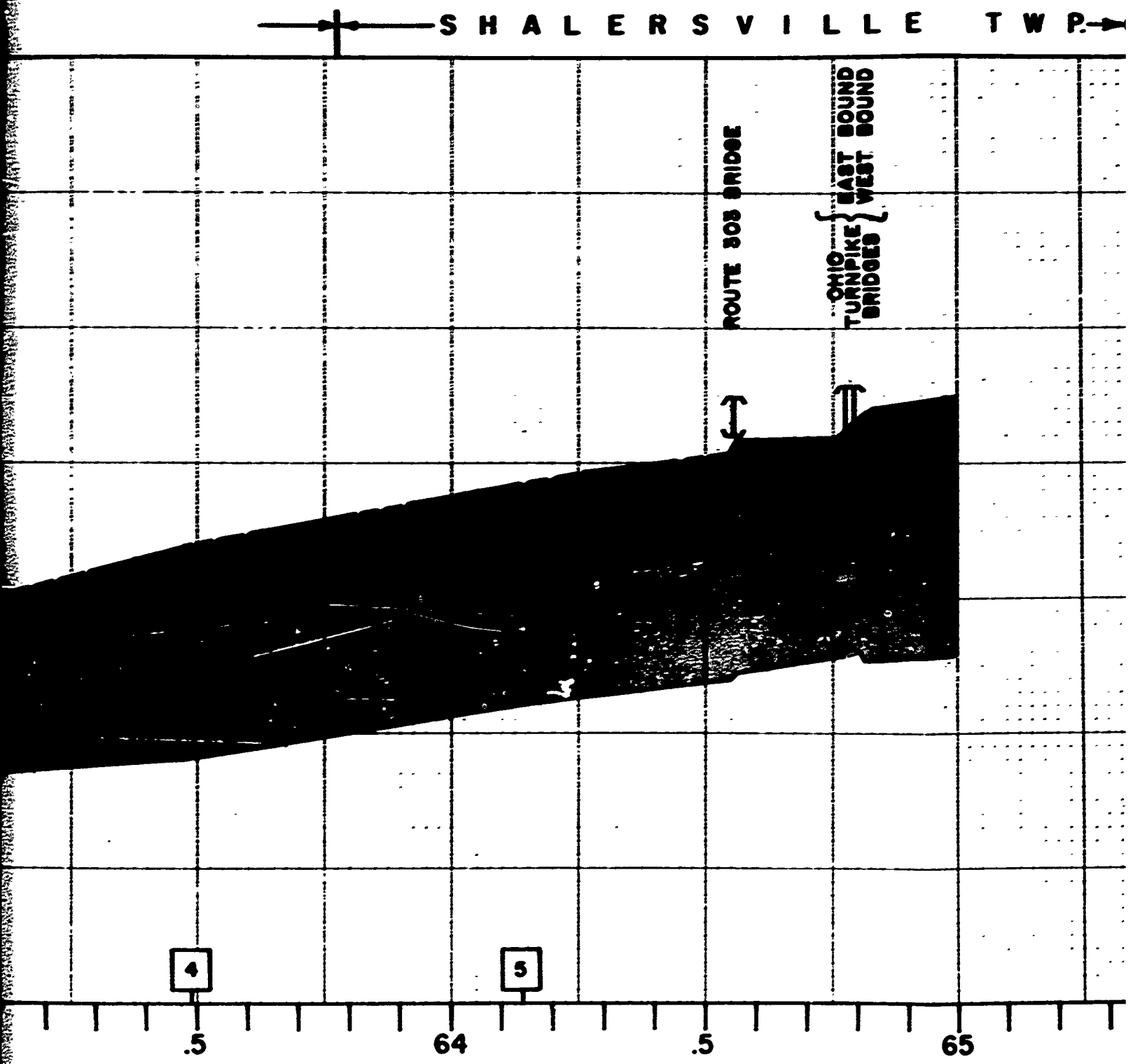
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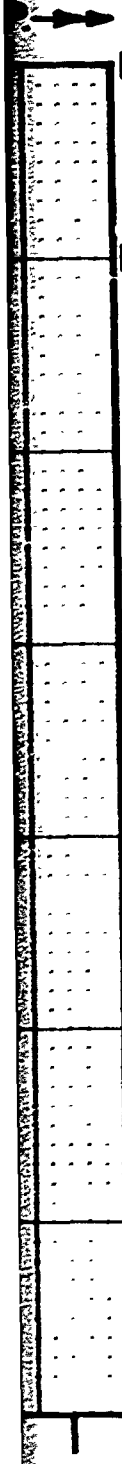


LEGEND

STANDARD PROJECT FLOOD

INTERMEDIATE REGIONAL FLOOD

APPROXIMATE STREAM BED

APPROXIMATE BRIDGE FLOOR ELEVATION

APPROXIMATE LOW STEEL ELEVATION

3 LOCATION OF VALLEY CROSS SECTION

NOTES

FLOOD PROFILES ARE BASED ON THE FOLLOWING:

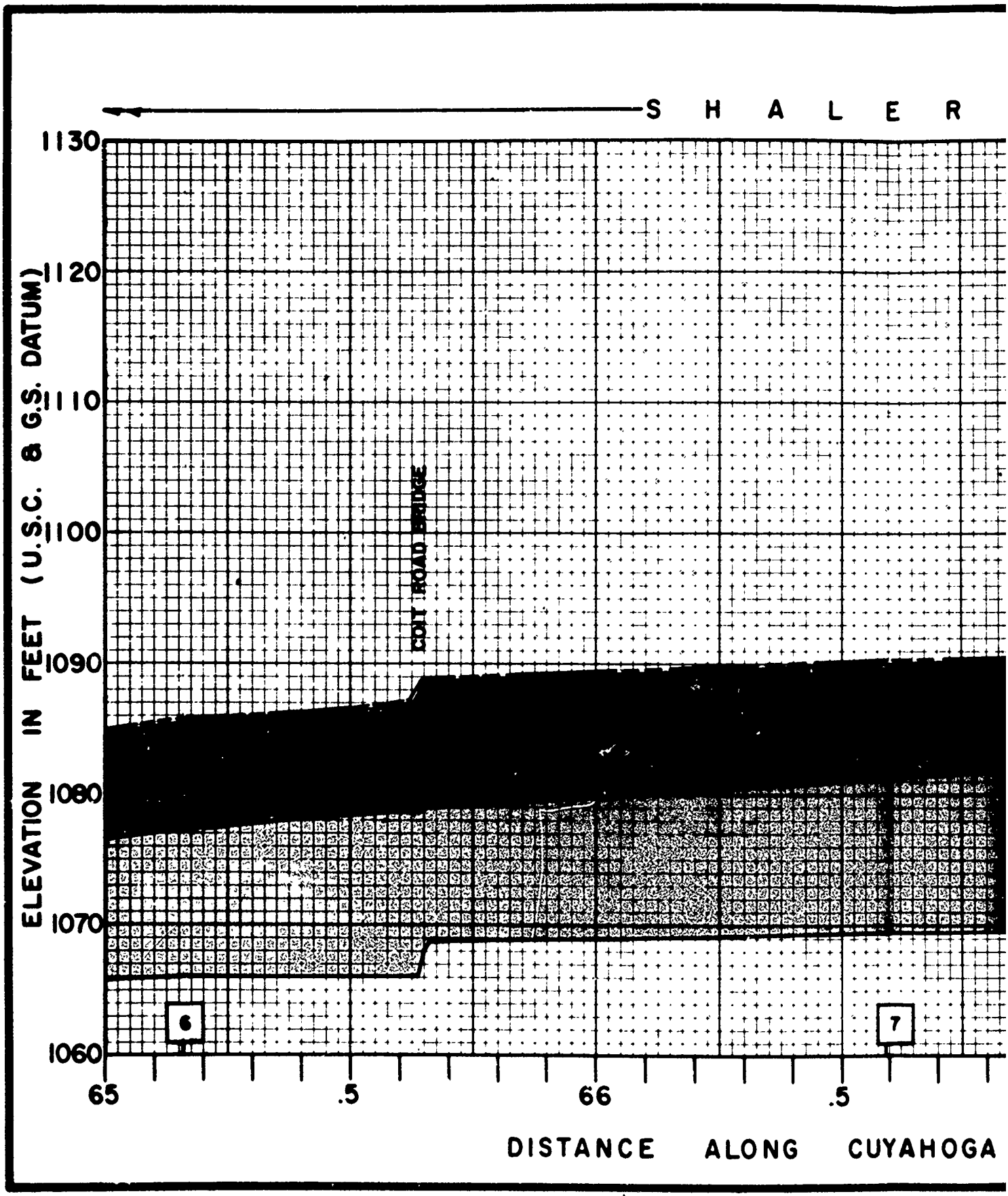
1. EXISTING CHANNEL CONDITIONS
2. EXISTING STRUCTURES
3. EXISTING CONDITIONS OF DEVELOPMENT

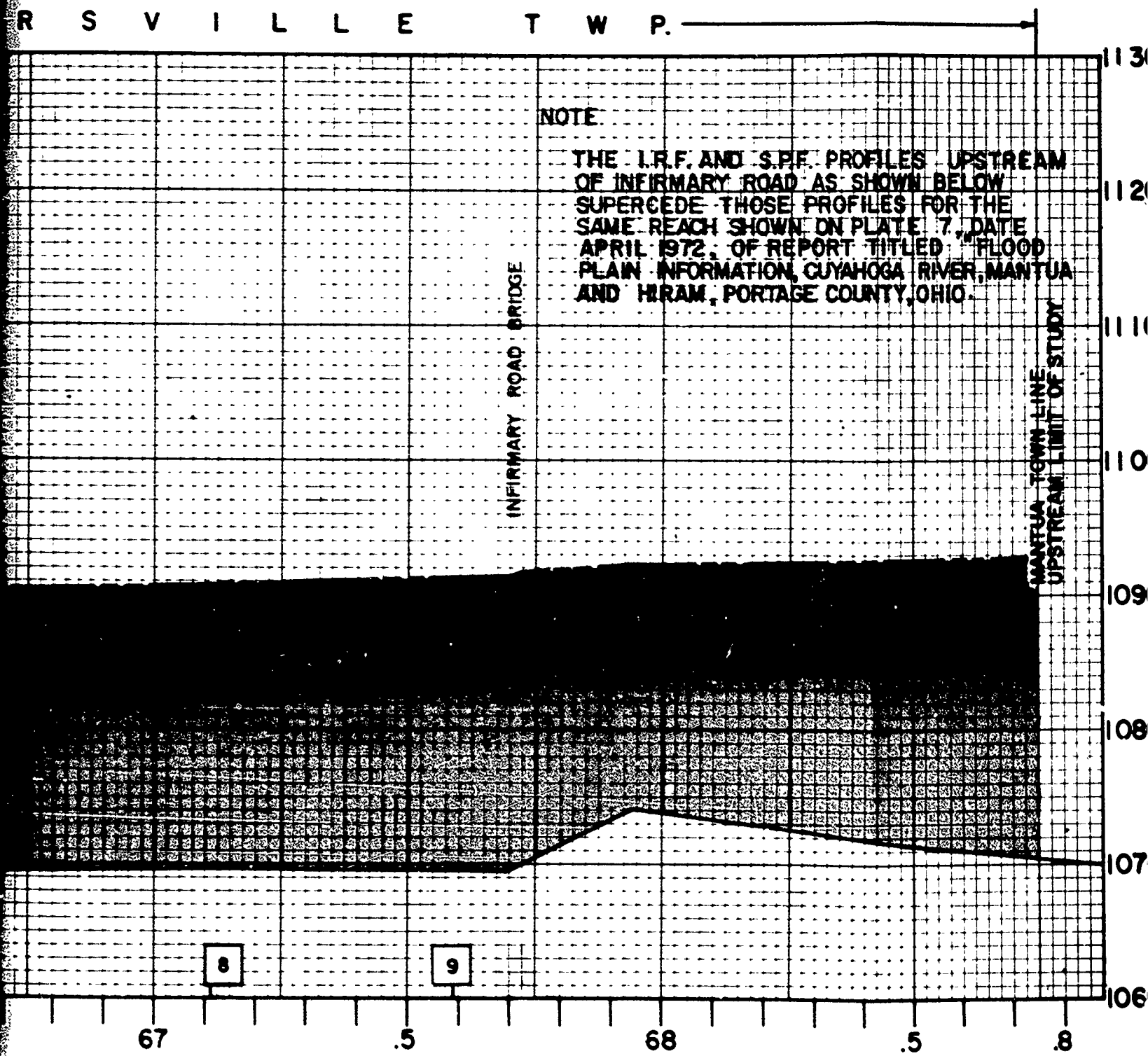
LARGE SCALE FILLING WILL RAISE PROFILES UNLESS SUFFICIENT FLOODWAY IS PROVIDED

CUYAHOGA RIVER
FRANKLIN TWP., CITY OF STREETSBORO AND SHALERSVILLE TWP.
PORTAGE COUNTY, OHIO
FLOOD PLAIN INFORMATION REPORT
PROFILE
MILE 61.50 TO 65.00
U.S. ARMY ENGINEER DISTRICT BUFFALO
JUNE 1974

PLATE 7

3


S H A L E R
1130
1120
1110
1100
1090
1080
1070
1060
ELEVATION IN FEET (U.S.C. & G.S. DATUM)
COLT ROAD BRIDGE
6
7
65
.5
66
.5
DISTANCE ALONG CUYAHOGA


R S V I L L E T W P.
NOTE
THE I.R.F. AND S.P.F. PROFILES UPSTREAM OF INFIRMARY ROAD AS SHOWN BELOW SUPERCEDE THOSE PROFILES FOR THE SAME REACH SHOWN ON PLATE 7, DATE APRIL 1972, OF REPORT TITLED "FLOOD PLAIN INFORMATION, CUYAHOGA RIVER, MANTUA AND HIRAM, PORTAGE COUNTY, OHIO.
INFIRMARY ROAD BRIDGE
MANTUA TOWN LINE
UPSTREAM LIMIT OF STUDY
113
112
111
110
109
108
107
106
8
9
67
.5
68
.5
.8
OGA RIVER FROM MOUTH IN MILES

1130

1120

1110

1100

1090

1080

1070

1060

LEGEND

STANDARD PROJECT FLOOD

INTERMEDIATE REGIONAL FLOOD

APPROXIMATE STREAM BED

APPROXIMATE BRIDGE FLOOR ELEVATION

APPROXIMATE LOW STEEL ELEVATION

7 LOCATION OF VALLEY CROSS SECTION

NOTES

FLOOD PROFILES ARE BASED ON THE FOLLOWING:

1. EXISTING CHANNEL CONDITIONS
2. EXISTING STRUCTURES
3. EXISTING CONDITIONS OF DEVELOPMENT

LARGE SCALE FILLING WILL RAISE PROFILES UNLESS SUFFICIENT FLOODWAY IS PROVIDED

CUYAHOGA RIVER
FRANKLIN TWP., CITY OF STREETSBORO AND SHALERSVILLE TWP.
PORTAGE COUNTY, OHIO

FLOOD PLAIN INFORMATION REPORT

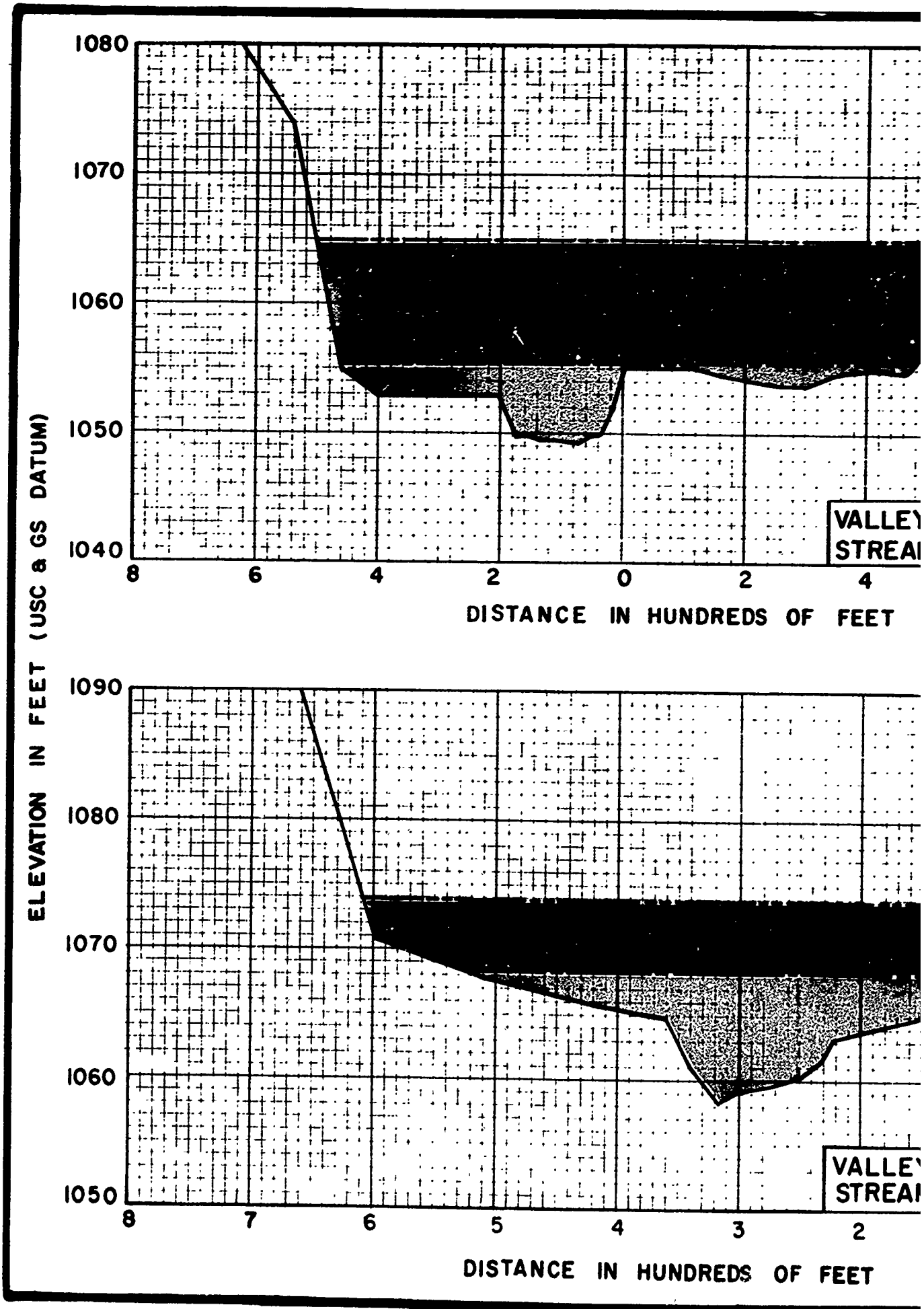
PROFILE

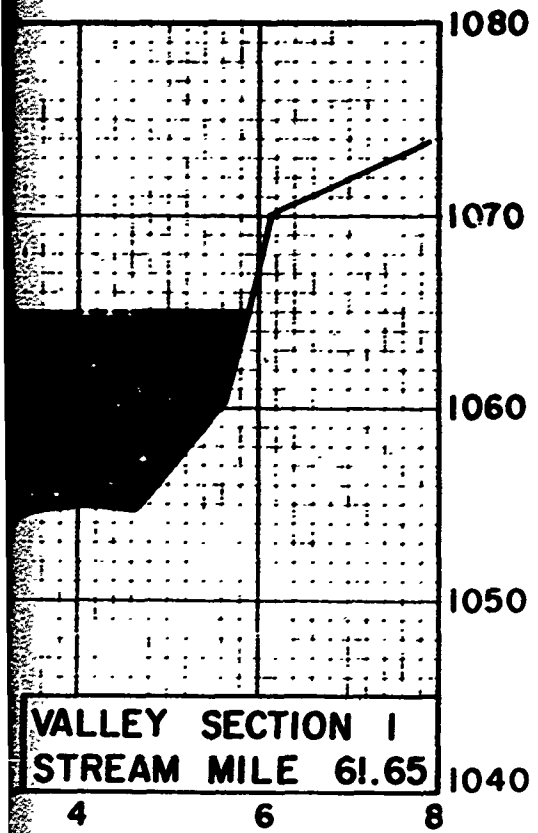
MILE 65.00 TO 68.75

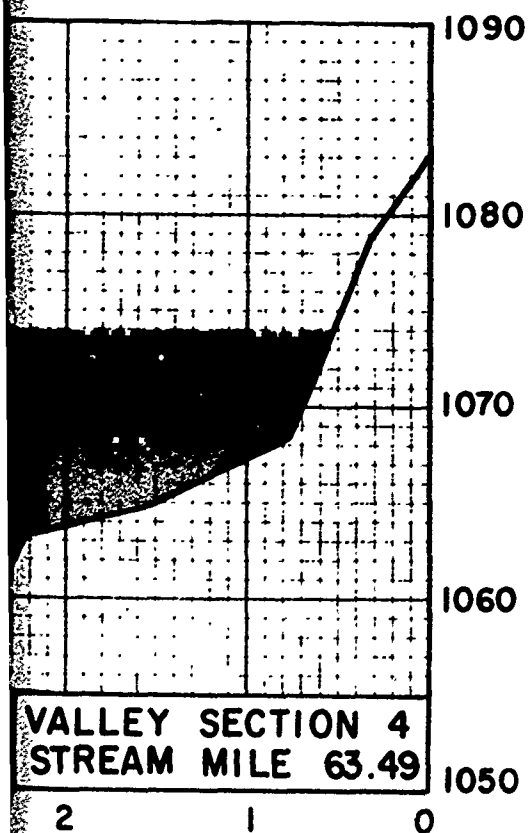
U.S. ARMY ENGINEER DISTRICT BUFFALO

JUNE 1974

PLATE 8


1080
1070
1060
1050
1040
8
6
4
2
0
2
4
DISTANCE IN HUNDREDS OF FEET
VALLEY
STREAM
ELEVATION IN FEET (USC & GS DATUM)
1090
1080
1070
1060
1050
8
7
6
5
4
3
2
DISTANCE IN HUNDREDS OF FEET
VALLEY
STREAM





LEGEND

STANDARD PROJECT FLOOD

INTERMEDIATE REGIONAL FLOOD

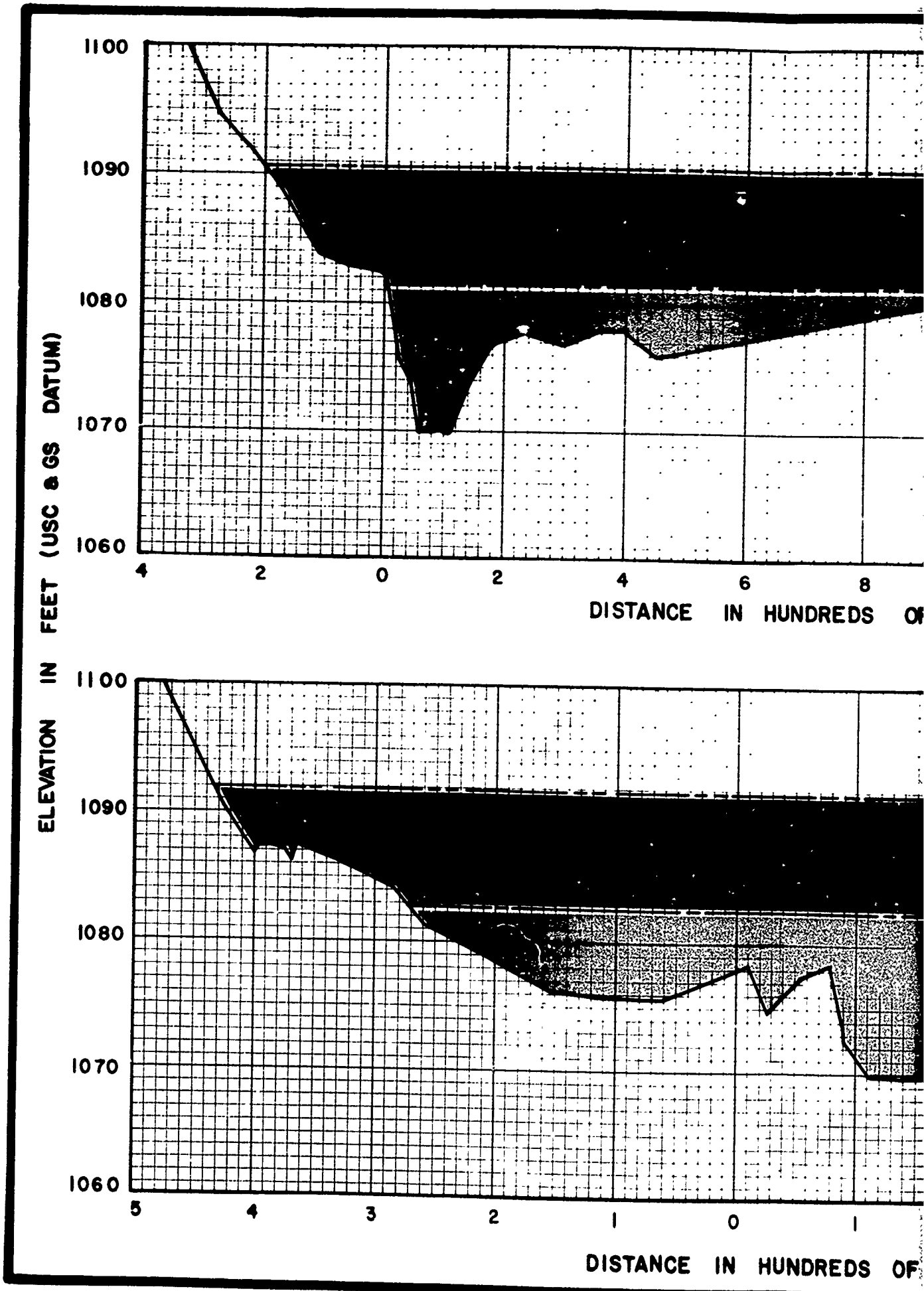
APPROXIMATE GROUND SURFACE

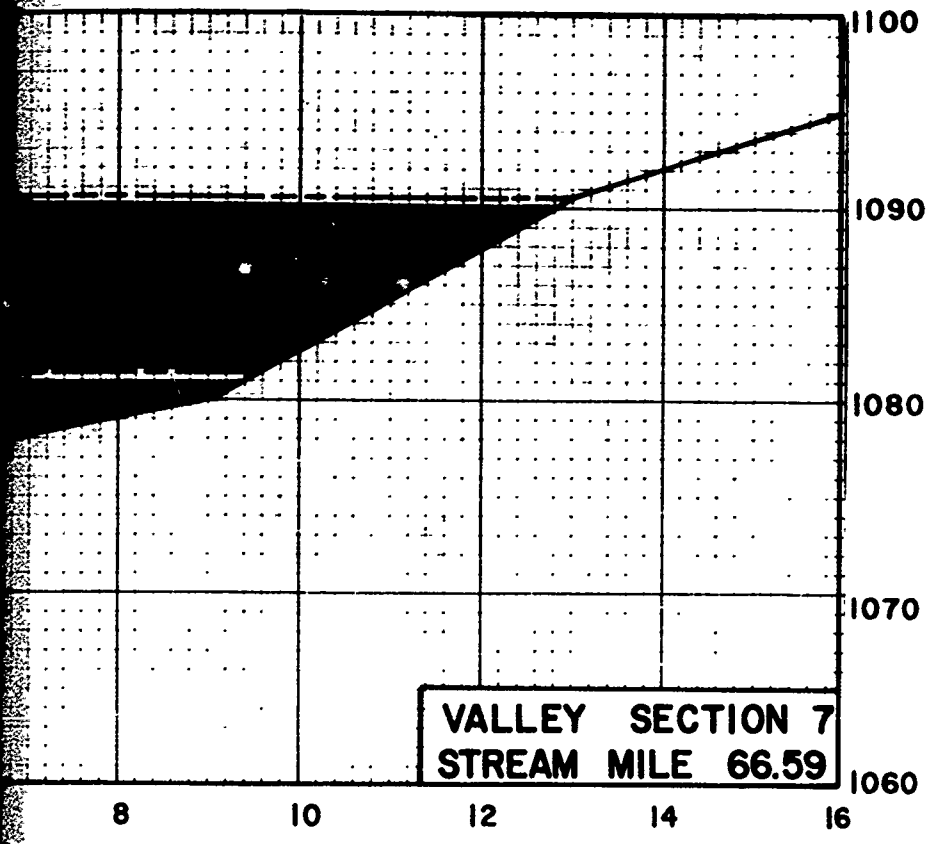
NOTES

VALLEY CROSS SECTIONS ARE BASED ON ACTUAL FIELD SURVEYS AND U.S. GEOLOGICAL SURVEY QUADRANGLE MAPS.

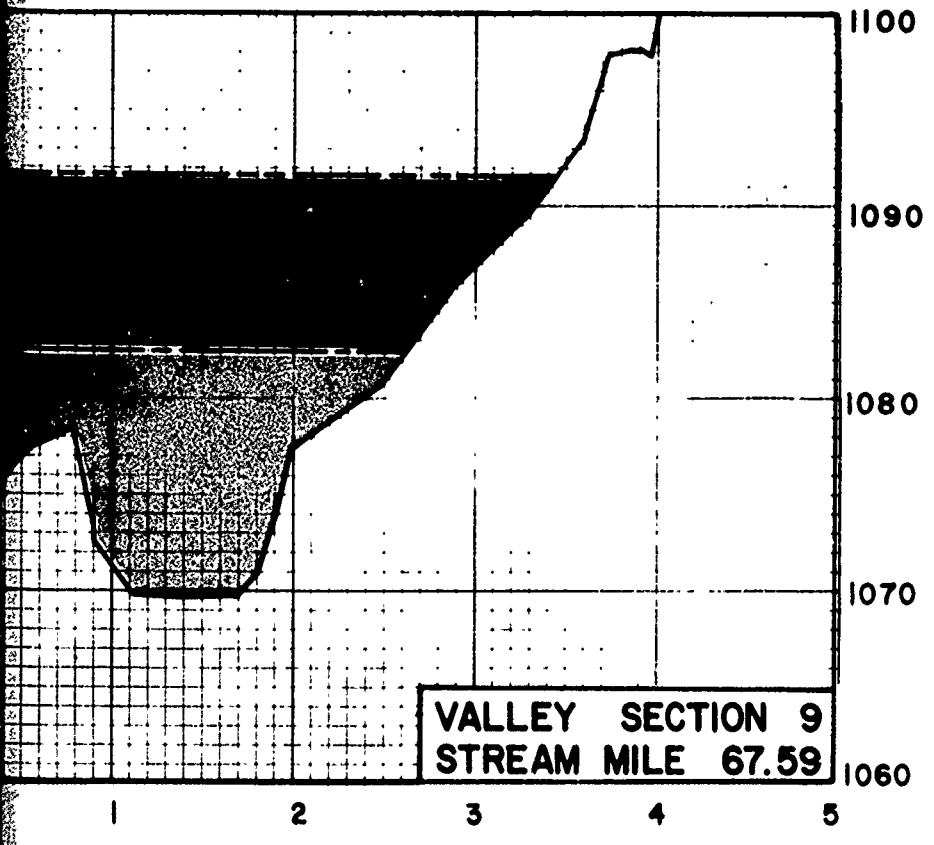
VALLEY CROSS SECTIONS ARE LOOKING DOWNSTREAM AND ARE LOCATED ON PLATES 3 AND 4.

CUYAHOGA RIVER
FRANKLIN TWP., CITY OF STREETSBORO AND SHALERSVILLE TWP.
PORTAGE COUNTY, OHIO
FLOOD PLAIN INFORMATION REPORT
VALLEY CROSS SECTIONS 1 AND 4
U.S. ARMY ENGINEER DISTRICT BUFFALO
JUNE 1974


1100
1090
1080
1070
1060
ELEVATION IN FEET (USC & GS DATUM)
4
2
0
2
4
6
8
DISTANCE IN HUNDREDS OF
1100
1090
1080
1070
1060
5
4
3
2
1
0
1
DISTANCE IN HUNDREDS OF



NDREDS OF FEET



NDREDS OF FEET

LEGEND

STANDARD PROJECT FLOOD

INTERMEDIATE REGIONAL FLOOD

APPROXIMATE GROUND SURFACE

NOTES

VALLEY CROSS SECTIONS ARE BASED ON ACTUAL FIELD SURVEYS AND U.S. GEOLOGICAL SURVEY QUADRANGLE MAPS.

VALLEY CROSS SECTIONS ARE LOOKING DOWNSTREAM AND ARE LOCATED ON PLATE 5.

CUYAHOGA RIVER
FRANKLIN TWP, CITY OF STREETSBORO AND SHALERSVILLE TWP.
PORTAGE COUNTY, OHIO
FLOOD PLAIN INFORMATION REPORT
VALLEY CROSS SECTIONS 7 AND 9
U.S. ARMY ENGINEER DISTRICT BUFFALO
JUNE 1974